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Editorial Director G. GEOFFREY SMITH, M.B.E.
Editor - - C. M. POULSEN
Assistant Editor - MAURICE A. SMITH, D.F.C. (WING CDR., R.A.F.V.R.)
Art Editor - - JOHN YOXALL

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# The Outlook

## International Aeradio

FROM every point of view the decision of the three British operating corporations to set up a new company for the purpose of installing and operating telecommunications and radio aids to navigation is to be welcomed. The fact that the new company will be a non-profit-making concern should go far towards allaying any suspicions that "Perfidious Albion" is trying to steal a march on anybody.

It has become abundantly clear during the last few months that if the P.I.C.A.O. recommendations are to become practical realities within a reasonable time, steps more energetic than any hitherto taken are called for. The number of recent accidents are eloquent testimony to the urgent need for quick action, and a company with no other tasks to perform should be in a far better position to get things moving than a heterogeneous collection of firms and Government departments with a number of other interests to require their attention.

One advantage of the new scheme which should be felt fairly soon is the application of communication and navigational aids and landing equipment on Empire air routes. It is but logical that, with the three British corporations holding 70 per cent of the shares, areas within their spheres will be the first to benefit, and it may be assumed that Dominion operators will be ready to avail themselves of an opportunity to share in the remaining 30 per cent.

It would appear likely that many smaller countries will be glad of the very practical assistance which such a company can offer them. Few of these countries would be able to afford the installation of modern equipment, whereas most of them could manage reasonable rentals for its operation. It is to be expected that in foreign countries the operating personnel will be partly British and partly composed of the nationals of the countries, at any rate for a start and until such time as sufficient experience has been gained for the work to be entrusted entirely to the countries themselves.

## Looking Ahead

CLOSELY connected with the formation of International Aeradio are some of the plans announced by the Minister of Civil Aviation at the Foreign Press Association luncheon, in London, on January 16th. Lord Nathan's promise that every effort will be made to have essential air navigation facilities installed before next winter at all major airports at home and, so far as possible, overseas wherever scheduled services are operated, indicates the Minister's full appreciation of the vital importance of safety. Indeed, one of his very first public pronouncements after his appointment was to the effect that he would place safety first, second and third.

Critics might argue that it is extravagant to have as many as eight different radio aids at Heathrow, but it should be remembered that final agreement on the forms ultimately to be standardized has not yet been reached, and in the meantime it cannot be considered other than wise to make available every aid that may help to ensure safety for the variously equipped types of aircraft which use the airport. The investment will pay dividends in the long run, not merely in money but in the far more important aspect of saving lives.

Other points from Lord Nathan's speech which promise improvements in the British civil aviation picture were the expansions of the three corporations' services (new flying-boat services to Africa and Australia, new Plymouth flying-boats on the New York and Baltimore runs via Bermuda, Tudor I services to South America, and additional European routes with Vikings) and the expectation that life may be made a little easier for the private owner and the light plane movement generally. Evidently the pleas of various interested (and enthusiastic) parties have not fallen on deaf ears.

With the informal Light Aeroplane Committee making a close study of the types of aircraft which it seems profitable to encourage, and with the Minister of Civil Aviation benevolently inclined, 1947 should see the lift-

ing of the cloud under which civil non-commercial flying has struggled since the war. At the very least, the forecast should change from ten-tenths to five-tenths.

## A Military Classic

THE recent war and its "lessons" have been discussed by innumerable people well enough acquainted with historical fact but incompetent to propound an argument with any degree of authority. The gaps in military literature they have left unfilled, or weakly stopped with the products of faulty reasoning, have now been plugged with weighty material, forcefully driven home by Marshal of the Royal Air Force Sir Arthur Harris, whose new book is reviewed in this issue.

By far the most significant work concerning the military aspects of the war, this is no esoteric treatise expounding academic doctrines but an absorbing narrative punctuated with firm declarations of principle.

Though "Bomber" Harris will always stand as the great advocate and wielder of the bomber weapon, he asserts that the bombing aircraft had its day during the last war (just as the U-boat was the predominant weapon in the 1914-18 war) and that it is more efficient to put atomic explosive into a guided missile. He has no doubt that the Air Force will "cling to the antiquated weapons with which it will consider its interests to be bound up." This plain speaking is paralleled by, and must be pondered in conjunction with, his references to the Army and Navy, to whose aid his forces were so frequently and so effectively diverted.

The Army and Navy, he maintains, after attempting unsuccessfully to destroy the R.A.F., are now speaking of "co-operation," realizing that this is the alternative to their own abolition. He himself would like to see all three Services abolished and one "Defence Force" take their place. The weapons of the future (the atomic bomb and its by-products), he argues, threaten the destruction of a country's industries in a matter of hours rather than years. Should we be misguided enough to attempt any other application of them we shall probably find that our enemies, before us, have destroyed the resources on which the existence of armed forces depends.

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## Light Aircraft

HITHERTO the Informal Light Aeroplane Committee has preferred to hide its light under a bushel. Last Saturday the bushel was lifted by inviting a number of interested parties to an inspection and demonstration of a number of light and not-so-light aircraft at White Waltham.

The purpose was to enable members of the Committee to assess the good and bad points of a wide variety of aircraft types. One doubts whether that object was really achieved. Mere inspection on the ground, and the watching of the simultaneous evolutions of several aircraft for a few minutes, does not provide a sufficient basis for a considered judgment, although several members of the I.L.A.C. were doubtless already very familiar with most types. Nevertheless, the meeting was well worth while if only because it served as a reminder of the characteristics of some of the older types, as well as indicating trends in the modern.

*"Flight" photograph.*

**IN SERRIED ROWS: An air picture of the light-plane assembly at White Waltham on Saturday last. Over forty different types were on show, but a number of them were flying when this photograph was taken.**

# LIGHT-PLANE PARADE

"Flight" photograph.

An Auster Autocrat performs against a lowering sun in a January sky.

## An Interesting Informal Meeting of Many Aircraft Types

ENTHUSIASTIC response to the invitation by the Informal Light Aeroplane Committee to manufacturers and owners to attend an informal meeting resulted in a very interesting and instructive day at White Waltham airfield last Saturday. The weather was more than kind, and the reception of aircraft and invited visitors was in the hands of Mr. Ronald Malcolm and the West London Aero Club, who provided an excellent lunch and later tea for the quite surprisingly large gathering.

First, however, it might be useful to explain what the Informal Light Aeroplane Committee is. It was formed with the object of trying to lay down certain guiding lines for the design of future light aircraft. Its chairman is Mr. Peter Masefield, Director-General of Long-Term Planning and Projects at the Ministry of Civil Aviation, and the Committee includes representatives of the Royal Aero Club, the Air League, owners, the technical Press and several other aviation interests.

The Committee has drafted specifications for six models of four basic types, and has discussed outline requirements of a further two types.

The meeting at White Waltham had been called with a view to getting together as many representative types as possible, foreign as well as British, so as to assess their good and bad points from a practical point of view. The aircraft were inspected on the ground during the morning, and after lunch most of them were adequately demonstrated.

At the lower end of the power scale were three Tipsy types: the little pre-war open two-seater, the even smaller single-seater with Douglas Sprite engine, and the Belgian Belfair enclosed two-seater which was exhibited at Paris and which had been flown over here from Belgium by Mr. Dickon in a gale of wind with no trouble at all, thus showing that this is a very practical little machine. This was the first aircraft to be built in Belgium after the war.

Slightly larger types represented were the Auster Autocrat and Arrow, and the Chrislea Ace.

Miles Aircraft were represented by almost every type, of which the Messenger, Gemini and Aerovan are in production, and an interesting side-by-side two-seater prototype with tricycle undercarriage and a canopy over the cockpit.

A range of de Havilland types was on view, including such old-timers as the T.K.2, Moth Minor, Tiger Moth, Hornet Moth and Leopard Moth, but also the Dove transport and, most interesting of all, the Chipmunk DHC-1, the Canadian-designed and built trainer, which created a very favourable impression by its attractive lines and

"Flight" photograph.

IMPORTED FOR EXPORT: The controls and instrument panel of the Helliwell Globe two-seater. Much of the transparent cabin roof is stained blue as a protection from the sun.

## LIGHT-PLANE PARADE

obviously practical layout. A surprising thing about the Chipmunk is that its empty weight is lower than that of the old Tiger Moth biplane, while the performance is, of course, vastly better.

Percival Aircraft were represented by a Proctor V, a thoroughly practical four-seater for which there should be a good market both in the immediate future and for some years to come.

Four German types had been expected: a Fieseler Storch, a Gotha Twin, a Hirtenberg monoplane, and a Messerschmitt Taifun. Only the Hirtenberg turned up. This machine is the property of Mr. J. H. Davis, of the Bristol Aeroplane Company, who flew it over from Gatwick, where he nearly got bogged before he got away. This is a very robust parasol two-seater, but one could not call it pretty.

American types whose absence was greatly regretted included the Republic Seabee amphibian, the Fairchild Forwarder and the North American Navion. However, a Grumman Goose represented the amphibian element, and Mr. Leslie Irvin's Beech Expediter, on which he and his pilot "Jimmy" Youell recently flew across from America, came in for much admiration as a well-equipped modern type with "every convenience."

"Flight" photographs.

**TWO NEWCOMERS: At the top is a three-quarter rear view of the all-metal Helliwell Globe and, at the bottom, is the new Miles prototype with tricycle undercarriage and bubble canopy.**

### Helliwell Globe

But the most intriguing American type was the little Globe Swift, an all-metal side-by-side two-seater with six-cylinder 125 h.p. Continental engine and Aeromatic airscrew. The machine itself has many interesting features, but what pleased the visitors as much as anything was that announcements painted on its sides gave the information that the type is to be built in this country by Helliwells of Walsall.

The Helliwell Globe, as the machine is apparently to be called in this country, is entirely of metal construction including the skin. It does not have a tricycle undercarriage, but the wheels are retractable. Fixed slots of the "letter box" type are built into the outer leading edges, and the trailing-edge flaps are electro-hydraulically operated, as is also the undercarriage retraction. A sliding canopy over the cockpit gives a very good range of view in all essential directions, and in spite of the small size of the machine, the cockpit is very roomy. Flying controls are of the push-pull wheel type and hanging rudder pedals. A step between them avoids the need for stepping on the seats when getting in and out. With a cruising speed of 140 m.p.h. and a still-air range at that speed of 600 miles, the Helliwell Globe should be a very attractive proposition if the cost of the all-metal construction can be brought down to a reasonable figure. This should be possible if a sufficiently large production is planned.

"Flight" photograph.

**SOME ASSESSORS: Left to right. Col. R. L. Preston, E. C. Bowyer, Peter Masefield, Ronald Malcolm and J. L. N. Bennett-Baggs.**

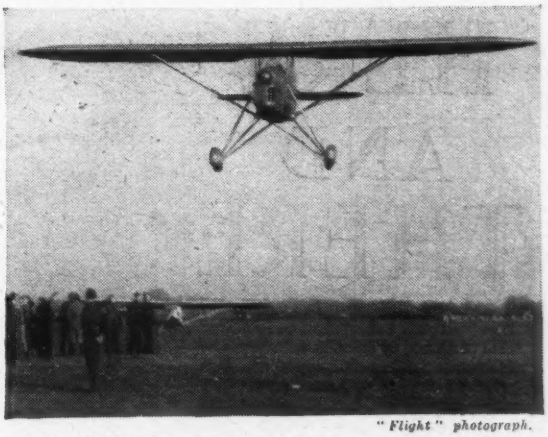
Of the flying demonstrations little need be said. They were of the usual type, and although at times there were rather too many machines in the air, no untoward incident marred the proceedings. One over-exuberant pilot had to be "shot down" while the Minister of Civil Aviation went for a flight in the de Haviland Dove, but that was all. Two items of the flying programme may be given special mention: Pat Fillingham's "hesitation rolls" on the Chipmunk, and the masterly handling of the only glider present. The latter included perfectly executed loops and wing-tip turns in an incredibly short radius, every evolution being a model of grace, and the final touch-down an example of precision flying.

## LIGHT-PLANE PARADE

And the lessons of the meeting? We do not know what conclusions members of the I.L.A.C. drew, but for our own part we came away with the feeling that although technically a number of very attractive features can now be incorporated in light aircraft, the whole thing in the end boils down to a question of £ s d. All-metal construction, retractable undercarriages, self-starters for the engines to avoid prop-swinging, power-driven undercarriage-retraction and flap operation, constant-speed airscrews; they are all very desirable, but are the markets available for the different types such that a sufficiently large production programme would be justified? That is really the fundamental question which must be answered before any firm could undertake to meet the I.L.A.C. specifications. In these the limiting cost is based upon a batch of "1,000-off." Unless the Ministry of Civil Aviation is ready to step in and place the bulk orders, later to sell the individual machines to purchasers, few firms are likely to be willing to speculate to the tune of laying-down 1,000 aircraft of a type. And nothing less would justify the necessary jigging and tooling.

And after all, was there really anything very much wrong with some of our pre-war small types? One feature we shall probably have to incorporate in the smaller post-war machines, whatever form they take otherwise: A satisfactory two-control system which will enable the purchaser to learn to fly his new acquisition in a few days so far as plain handling of the machine is concerned. (He will still have much to learn before he goes on extended cross-country journeys.) We are glad to see that I.L.A.C. suggest that if this is not actually incorporated in the three smaller types, the machines should have good anti-spin and stall characteristics, and provision should be made for incorporating the two-control system to be fitted later, when a satisfactory form has been developed. It was unfortunate that no representative of the two-control school was seen at White Waltham. The Chrislea Ace has no rudder pedals, but its three controls are combined in the wheel, and co-ordination is still necessary.

There is still much to be done in the direction of noise reduction. Many of the present types, even the most modern, are serious offenders. But occupants as well as the earth-bound public will not for ever tolerate the unholy din which too often appears to have been accepted as unavoidable.



"*Flight*" photograph.

**EX-ENEMY: The Hirtenberg high-wing monoplane sports a mild shoot-up over the aircraft park.**

### DE-ICING THE VIKING

MAJOR H. R. KILNER, managing director of the aircraft section of Vickers-Armstrongs, Ltd., announced at a Press conference on January 17th that there was every prospect that the icing difficulties which had resulted in the Vikings being temporarily withdrawn from the European services would be overcome in the near future. The trouble had been found to be overbalancing of the elevators when ice formed there, and tests made had indicated that a slight modification of the elevators coupled with an increase in the rate of delivery of the de-icing fluid would effect a cure. This would mean that more de-icing fluid would have to be carried instead of fuel, so that on some services the range might have to be slightly reduced.

### F. A. de V. ROBERTSON

WITH his sudden death in Paris on January 14th we on *Flight* have lost an old and dear friend. He began work for this journal some 20 years ago, dealing chiefly with matters relating to the Royal Air Force, of which he had an intimate knowledge. He retired from our active staff at the end of March of last year, failing health making him long for the rest to which he was so well entitled.

Frederick Arthur de Vere Robertson went to India after leaving Oxford, and there worked as a journalist on various Indian papers. He came to this country as a volunteer with the Indian Army and served in France in the first World War. After being invalided out, with the rank of Major, and the award of a V.D., he served for a time as a stores officer in the R.A.F., and after the war held various posts, including a period in the Air Ministry Press Section under Mr. C. P. Robertson, and another period with A. V. Roe and Co., Ltd. For several years Major Robertson was Air Correspondent of the *Manchester Guardian*, and his work on *Flight* was not confined to the journal itself; for instance, he wrote the book "Squadrons of the Royal Air Force" which we published, a task for which his extensive knowledge of squadron histories particularly qualified him.

"F.A.," as we always called him, was a gentleman in the best sense of the word. Courteous, kind and considerate, he had not a mean trait in his character. Scholarly and well read he was to a high degree, and we on this journal owe him much for his knowledge of and advice on subjects outside the immediate sphere of aviation journalism.

The loss of his wife some years ago was a blow which Robertson never really got over. Of friends he had many, but they could not altogether compensate him in the loneliness which followed her death. He had looked forward to spending a few weeks in the South of France, and to getting away from the English climate which did not suit him, and it is sad to reflect that this innocent pleasure was denied him, and that he should pass away alone and in a foreign country while in search of the sunshine which he loved. C. M. P.

### FUEL INJECTION ON CONSTELLATIONS

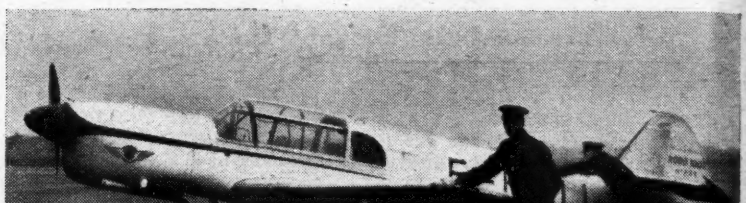
THE Wright R-3350 engines which T.W.A. are now installing in their Constellations are equipped with two injection pumps and a fuel injection system. It is said that the fuel is metered as on the former carburettor system, but is then supplied to each cylinder at high pressure.

### CIVIL AVIATION IN NORWAY

DEVELOPMENT of the landing ground at Eggemoen, which at the moment has one very wide runway, is understood to be under consideration. It is situated about eighty miles north of Oslo and is intended as a diversion for Gardermoen and Fornebu, Oslo. A modern lighting system will be installed and an efficient snow-clearing organization will be maintained in addition to the normal services required for a diversion airfield. It is not yet known what blind-approach system will be installed.

D.N.L., the Norwegian airline, is expecting delivery of three Sandringham flying boats during the next three months, to be used on the internal routes to the north of Norway. Two DC-6s and one Stratocruiser are also expected early this year. These American aircraft will be the Norwegian contribution to Scandinavian Airlines, which, of course, is a combination of Norwegian, Swedish and Danish interests for the purpose of operating Atlantic routes. The D.N.L. fleet at present consists of eleven DC-3s, two DC-4s, one Condor, one Flying Fortress, and one JU.52. It is understood that a considerable amount of freight is being flown into Oslo, and several new charter companies are being formed by shipping companies. In this connection the Olsen Shipping Company is adding to its fleet of DC-3 freighters, and Braathen has formed a new company, S.A.F.E., to be concerned mainly with trade to South America. Three Skymasters have been ordered, one of which has already been delivered.

# HERE AND THERE



**FRANCO-GERMAN. A number of these Me 108 light communications type were produced by S.N.C.A.N., one of the six State-owned French concerns. This one, seen at Croydon, was chartered by Prof. Smertenko for his ill-advised visit to England recently.**

## A Creditable Record

SOME figures just issued for B.O.A.C.'s Baltimore-Bermuda service during 1946 show a very creditable performance.

During the year, this service carried 12,679 passengers as well as 13,153lb of freight and 15,912lb of mail.

Of the 324 flights made, only two were delayed.

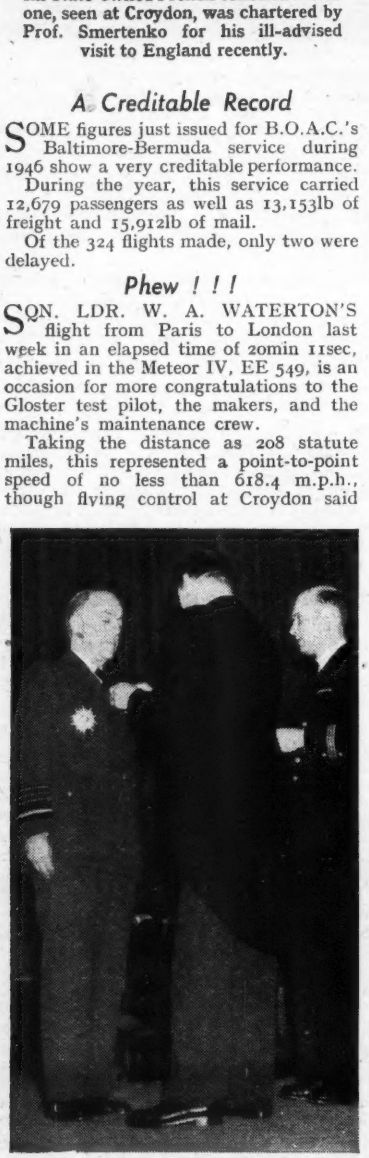
## Phew ! ! !

SQN. LDR. W. A. WATERTON'S flight from Paris to London last week in an elapsed time of 20min 11sec, achieved in the Meteor IV, EE 549, is an occasion for more congratulations to the Gloster test pilot, the makers, and the machine's maintenance crew.

Taking the distance as 208 statute miles, this represented a point-to-point speed of no less than 618.4 m.p.h., though flying control at Croydon said at the time that the generally accepted mileage had not been finally settled for record purposes.

The time was not, of course, a take-off to touch-down reading; Waterton dived down over the Le Bourget control to about 2,000ft and then climbed to 12,000 ft for the Channel crossing, losing height again gradually as he crossed the English coast and finally diving down for the time check over Croydon flying control.

Apart from the initial climb, he used only approximately four-fifths throttle and he had no help from the 25-knot wind which was almost dead on his port beam.



**AIR CHIEF MARSHAL Sir Arthur Barratt receiving the Legion of Honour from M. Massighn, the French Ambassador, at the Institut Français in London last week.**

## Gas Turbine Loco

A 2,500 h.p. gas turbine locomotive is being built by Metro-Vick at Manchester for the G.W.R., and is intended for express passenger work between Paddington and the West Country, Fishguard, and Birkenhead.

## New C.I.A. Chief

COMMANDER J. M. KEENE-MILLER, O.B.E., who was appointed general manager of Channel Islands Airways last August, has now been made managing director of this company in succession to Commander G. O. Waters, his promotion being announced at a meeting of the board held in Jersey on January 15th.

During the war Commander Keene-Miller served with the Fleet Air Arm, but he first joined the airline in March, 1934, when it was Jersey Airways, Ltd.

## Want an Anson?

A REUTER report from Sydney last week announced that a Mr. Eric McIllree, an Australian business man, had bought 35 Anson aircraft from Disposals Commission there and intended to have them flown to England for sale here.

The first batch of three is to leave on February 10th, one of them being flown by Mr. McIllree himself, and the other two by ex-R.A.A.F. pilots to each of whom he is paying £500 as a ferrying fee.

## Providential Proctor

LISBON newspapers recently published an account of how a Percival Proctor belonging to the Portuguese concern, C.T.A., flew from Lisbon to Madrid in 2hr 15min with a package of streptomycine to save the life of a Spanish child suffering from meningitis.

Since the Spanish motto is traditionally "mañana" (tomorrow) it may surprise readers to hear that putting a 'phone call through from Madrid to Lisbon, getting hold of the drug, chartering the aircraft and getting permission for it to land at Madrid was all accomplished in 45min—until it is explained that the child's father was an old pal of Franco's!

## "Skystreak"

ACCORDING to a recent report from Washington, a new experimental jet-propelled Douglas aircraft, a single-seater officially designated the D-558, is to be "unveiled" in California on February 5th and will attempt to exceed the speed of sound. It has been given the name of *Skystreak*.

It appears that the *Skystreak* has only just been completed and had not flown at the time the statement was made by the U.S. Navy authorities, who added that exhaustive slower-than-sound test flights would be carried out before the attempt to "crash the supersonic barrier."

## Forging Ahead

WITH so many people complaining of their industrial activities being impeded by shortage of man-power and scarcity of raw materials, it was a pleasant change to read Mr. G. H. Dowty's report to the tenth annual meeting of the celebrated Cheltenham firm bearing his name.

"I am glad to report," he said, "that the manufacturing facilities in your Cheltenham plant are fully engaged on aircraft work. The volume of aircraft business on hand is twice that of any peacetime period, and we are in an excellent position to give satisfactory deliveries of all present orders."

A large proportion of their output, Mr. Dowty added, was equipment for civil airliners.

## Air League for S. Africa

WITH the object of discovering what possibilities exist in South Africa for the formation of an Air League there, the Duke of Sutherland is paying a visit to the Union.

As a former president of the Air League of the British Empire, and at present a member of its executive committee, the Duke of Sutherland will be able to offer any help the South Africans may need if they decide to form an Air League of their own.

He should have arrived in Cape Town by the time these words appear in print, after which he will visit Durban and Johannesburg, addressing meetings and

## HERE AND THERE

having informal talks, and expects to be back in England before the end of February.

### *Confidence Unshaken*

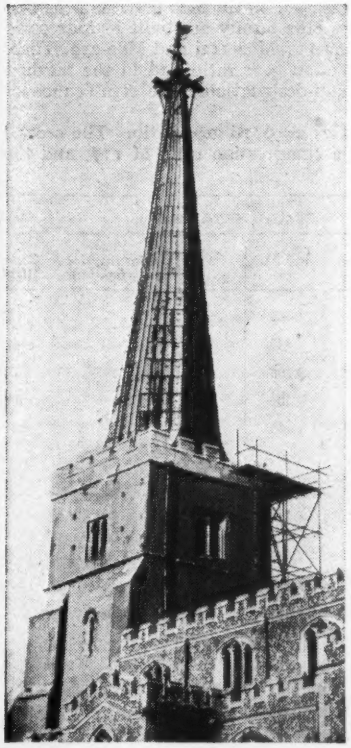
ALTHOUGH there have been reports of a falling off in air bookings on American services—a decline believed to have been caused at least in part by recent accidents widely publicized—the popularity of air travel between the U.K. and the Continent is reported by K.L.M. to be taxing the capacity of their aircraft.

Between July last and December 31st they carried no fewer than 21,882 passengers between Croydon and Amsterdam.

### *Training Tour*

NEARLY half the personnel of United Airlines, numbering more than 5,000 mechanics and other maintenance men, radio men and electricians, baggage men, service crews, stewardesses and other passenger service personnel, are to receive on-the-spot training from the special instruction crew of one of their new DC-6 airliners (the "Mainliner 300") which is making a tour of the airline's entire system.

Two sister aircraft are also being used for pilot and engineer training at the company's base at San Francisco, and some 350 captains and first officers are to be instructed.



**HIGHLIGHT: A red beacon of four lights is to be placed on Harrow Parish Church spire, said to be the loftiest spot in Middlesex, in the interests of air traffic.**

**COCOONED BOMBERS: Several hundred B-29s are being sealed for four to five years' storage, at Macon, by the application of five coats of a special plastic and the introduction into the resultant skin of a dehydrating agent.**

## *News in Brief*

AUSTRALIAN airline companies report that their safety record is improving as their services expand, and that air travel in the Commonwealth reached a record figure last week. Passenger accommodation is booked up for months ahead.

* * *

G/C. A. F. Bandit landed at Mascot airfield, Sydney, on Tuesday of last week in the Miles Gemini, having flown across Australia from Truscott airfield, near Darwin. His home is at Goomeri, Queensland.

* * *

The Rolls-Royce workshops at Derby, birthplace of many record-breaking engines during the past 20 years and now turning out jet propulsion aircraft units, were recently filmed by *Pathé Pictorial*.

* * *

Messrs. W. G. Hendrey and W. H. McFadzean, directors of British Insulated Callender's Cables, Ltd., are paying a visit to their firm's branches in India. They are expected to be away for several months.

* * *

When Mr. Norman Gee, a race-horse owner, arrived at Yeovil in a chartered H.A.T. aircraft for the meeting at Wincanton just after Christmas, there was no car to take him to the course. So his pilot, Capt. Collins, flew him over the course in time to see, through binoculars, his own entry finish second in the 2.15 p.m. race. Fortunately, it was a "grey" and easily picked out.

* * *

Maj. R. H. Mayo, F.R.Ae.S., has been appointed to represent the R.Ae.S. on the Segrave Trophy Award Committee. This trophy, as most readers will remember, is awarded annually for the best performance on land, sea, or in the air during the previous 12 months, and is in memory of the late Sir Henry Segrave, several times holder of the World's Land Speed Record, who was killed in June, 1930, when attacking the World's Water Speed Record on Lake Windermere.

* * *

By introducing a change of crew at Natal (Brazil), K.L.M. have reduced the Amsterdam-Montevideo schedule by no less than 24 hours. With only one night stop, at Lisbon, their DC-4s cover the 7,000 miles flight in an elapsed time of 57 hr 50 min. Actual flying time is 37 hr.

* * *

Mr. F. W. Osborn has been appointed Midland branch manager of the British Aluminium Co., Ltd., at Lansdowne House, 41, Water Street, Birmingham. He replaces Mr. C. G. Poultney who resigned from the firm's staff on December 31st.

* * *

Bell Aircraft recently sold 27 of their Model 47-B helicopters, for which they obtained £170,000. Among the purchasers were Canada and Sweden.

* * *

Blackpool is to have a three-weeks' aircraft exhibition in July with a flying display by the R.A.F. on one day of each week. It will be staged at Squires Gate and the local authorities claim it will be the biggest event of its kind ever held in Britain. Representatives of the local council have already obtained the support of the Air Ministry and Ministry of Civil Aviation, and are seeking the co-operation of the S.B.A.C.

* * *

Mr. H. J. Holmes has been appointed Dunlop's regional manager for the West of England with headquarters at Bristol, and Mr. V. V. Thorpe is appointed district manager at Bristol. During the war Mr. Holmes was Director of Tyres at the M. of S., and Mr. Thorpe served as an inspector in the same department.

D

# Soviet Aircraft Engines

## *Details of Representative Operational Types*

THE Soviet aircraft and aero-engine industry was born during the bleak post-revolutionary years. Heavy industry had priority, for without it there could be no question of aircraft, and still less of engine production. In order not to lag unduly behind other countries, production rights for foreign engines were acquired. The shortcomings of these were studied, thus saving "many efforts and disillusionments" and, what was more important, much time, which was used for training specialists. So far as is known large-scale production of aero-engines in Russia started about 15 years ago, says Lt. Windholc.

At this point in his story the Polish writer asserts that the Polish aircraft industry is likewise being built from the foundations and that "the history of the Soviet engine industry gives an example from which much can be learned."

In more factual vein, he goes on to record that during the war the Soviet Air Force used eighteen different engines which were variants of seven basic types—5-cylinder, 9-cylinder and 14-cylinder radials and 12-cylinder Vees. All except one—the M40F Diesel—are four-stroke petrol engines.

*LITTLE information of any value concerning Russian aircraft and power plants has become available since the war and it has been considered worthwhile to translate an article on Soviet aero-engines, by Lt. Alfred Windholc, appearing in the Polish journal "Skrzydlata Polska." The gist of this article, which is based on a previous account entitled "The U.S.S.R. Engines in Combat" by the Soviet engineer Karmarin, is paraphrased herewith.*

For training aircraft the M11 series of 5-cylinder radials is standard. In the next category are the 9-cylinder M62 and M63 types, as well as the older M25, which is not included in the accompanying table. It may be remembered that the M25 was a Soviet version of the American Wright Cyclone 9, and that it served as a prototype for the M62 and M63.

"Comparing the technical features of the Soviet and American Cyclone engines," states the author, "we are bound to notice the smaller output of the latter." Here it may be mentioned that though he may have been bound to note this, it is not substantiated by published figures for the American Wrights, which deliver up to 1,350 h.p. for take-off.

The machining of parts, as well as the overall finish of the Soviet engines, is stated as showing the high standard of Soviet engineering and, as an example, the "extraordinarily clean casting and the close and high cooling fins of the cylinder heads" is mentioned. The Russian Cyclone developments are extensively used in the PS-84 and Li-2 transport machines, both of which are variants of the Douglas DC-3.

In the third group of engines (volume 38.65 litres) are the 14-cylinder M88B and M89, which were preceded by the M85, M86 and M87 series. The M89 has recently been adapted for fuel injection. Large quantities of M88BS were produced for installation in the twin-engined IL-4 (DB-3F) bomber, in the Su-2 reconnaissance machine and in certain fighters. The M89 has likewise been applied to fighters.

Another type of 14-cylinder air-cooled engine—the M82 of 41.2 litres capacity—is a variant of the American Wright Double-Row Cyclone, but is characterized by a shorter stroke (155 mm against 160.3 mm). The compression ratio has been raised from 1 : 6.85 to 1 : 7 and the overall dimensions are smaller.

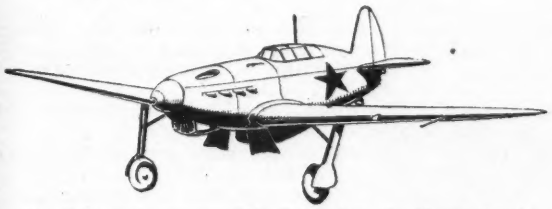
Direct fuel injection is used on the M82 FNW and the carburettor engines of the M82 family are built in four basic types—the M82-111, M82-112, M82-112i and M82-212. These variants differ in reduction gear ratio and in the method of starting. In the sub-designations, the significance of the first figure is:—

1 = 11 : 19 gear ratio; 2 = 9 : 16 gear ratio. The second figure (1) indicates a compression ratio of 1 : 7, and the

| Type | No. and disposition of cyls | Cooling | Bore (mm) | Stroke (mm) | Capacity (litres) | Compression ratio | TAKE-OFF RATING Output (h.p.) | R.P.M. | Boost (atm) | Fuel consumption (g/h.p./hr) | Output (h.p.) | Alt. (m) | Height (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M11 G ... ... | 5, radial ... ... | AIR | 125.0 | 140.0 | 8.6 | 5.0 | 110 | 1,660 | — | — | 100 | 1[illegible] | s.l. |
| M11 F ... ... | 5, radial ... ... | AIR | 125.0 | 140.0 | 8.6 | 5.0 | 140 | 1,740 | — | — | 145 | 1[illegible] | s.l. |
| M62 ... ... ... | 9, radial ... ... | AIR | 155.5 | 174.5 | 29.8 | 6.4 | 1,000 | 2,200 | 1.43 | 295<br>350 | 850<br>800 | 2[illegible] | 5,00<br>13,75 |
| M62 JR ... .. | 9, radial ... ... | AIR | 155.5 | 174.5 | 29.8 | 6.4 | 1,000 | 2,200 | 1.43 | 295<br>350 | 840 | 2[illegible] | 4,90 |
| M62 R ... ... | 9, radial ... ... | AIR | 155.5 | 174.5 | 29.8 | 6.4 | 1,000 | 2,200 | 1.43 | 295<br>350 | 850<br>800 | 2[illegible] | 5,00<br>13,75 |
| M63 ... ... ... | 9, radial ... ... | AIR | 155.5 | 174.5 | 29.8 | 7.2 | 1,100 | 2,300 | 1.45 | — | 1,000<br>900 | 2[illegible] | 5,90<br>14,76 |
| M88B ... ... | 14, two-row radial | AIR | 146.0 | 165.0 | 38.65 | 6.1 | 1,100 | 2,300 | 1.29 | 290<br>320 | 1,100<br>1,000 | 2[illegible] | 13,10<br>19,65 |
| M89 ... ... ... | 14, two-row radial | AIR | 146.0 | 165.0 | 38.65 | 6.1 | 1,300 | 2,400 | 1.5 | 320<br>340 | 1,240<br>1,140 | 2[illegible] | 11,45<br>19,65 |
| M82—111, 112, 112i, 212-3 ... ... | 14, two-row radial | AIR | 155.5 | 155.0 | 41.2 | 7.0 | 1,700 | 1,400 | 1.55 | 320 | 1,540<br>1,330 | 2[illegible] | 6,70<br>17,70 |
| M82 FNW ... ... | 14, two-row radial | AIR | 155.5 | 155.0 | 41.2 | 7.0 | 1,850 | 2,500 | 1.60 | 325 | 1,650<br>1,450 | 2[illegible] | 5,40<br>15,25 |
| M105-R, -P, -PA ... | 12, Vee, 60 deg ... | LIQUID | 148.0 | 170.0<br>175.0 | 35.0 | 7.1 | 1,100 | 2,500 | 1.29 | — | 1,100<br>1,050 | 2[illegible] | 6,55<br>13,10 |
| M105 PF ... ... | 12, Vee, 60 deg ... | LIQUID | 148.0 | 170.0<br>175.0 | 35.0 | 7.1 | 1,210 | 2,600 | 1.43 | — | 1,260<br>1,180 | 2[illegible] | 2,60<br>8,85 |
| M105 PD ... ... | 12, Vee, 60 deg ... | LIQUID | 148.0 | 170.0<br>175.0 | 35.0 | 7.1 | 1,100 | — | — | — | 1,200<br>1,050 | [illegible] | 6,50<br>21,00 |
| M107A ... ... | 12, Vee, 60 deg ... | LIQUID | 148.0 | 170.0<br>175.0 | 35.0 | 7.1 | 1,600 | — | — | — | 1,600<br>1,500 | [illegible] | 5,50<br>14,76 |
| AM35A ... ... | 12, Vee, 60 deg ... | LIQUID | 160.0 | 190.0<br>196.7 | 46.7 | 7.0 | 1,350 | 2,050 | 1.69 | 330<br>360 | 1,200 | 2[illegible] | 19,65 |
| AM38 ... .. | 12, Vee, 60 deg ... | LIQUID | 160.0 | 190.0<br>196.7 | 46.7 | 6.8 | 1,600 | 2,150 | 1.75 | 305<br>325 | 1,550 | 2[illegible] | 6,55 |
| AM38F ... ... | 12, Vee, 60 deg ... | LIQUID | 160.0 | 190.0<br>196.7 | 46.7 | 6.8 | 1,700 | 2,350 | 1.85 | 325 | 1,550 | 2[illegible] | 6,55 |
| M40F ... ... | 12, Vee ... ... | LIQUID | 180.0 | 200.0<br>209.0 | 62.34 | 13.5 | 1,500 | 1 950 | 1.70 | — | 1,250 | [illegible] | 19,65 |

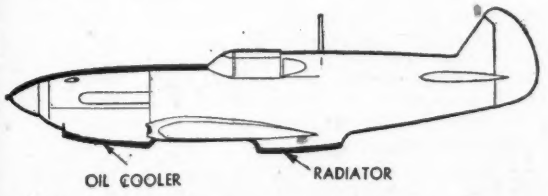
meaning of the final symbols is:—1=inertia starting; 2=compressed air starting; i=single-stage booster. The nature of a "single-stage booster" is not made clear.

Engines of the M82 series are fitted as standard in the La-5 fighter, regarded during the war as the Russian counterpart of the FW190, in the Pe-8 four-engined bomber, and in Tu-2 high-speed twin-engined bomber.



**The light and manœuvrable Yak-1 has the M-105 liquid-cooled-Vee engine.**

Smallest of the liquid-cooled units, the M107, power plant of the Yak-11 fighter, has been developed from the earlier M100, M103 and M105, all based on the French Hispano-Suiza 12Y. It differs from its predecessors in having reinforced cylinder walls and, unlike the M105, which has three valves, it has one inlet, two exhaust and one scavenging valve.

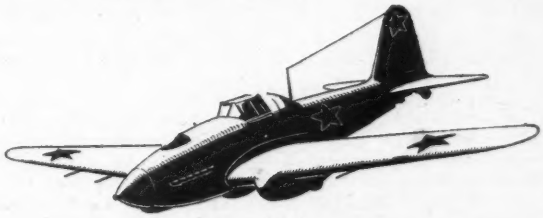



**Another fighter and ground-attack machine with the M-105 is the Lagg-3.**

The AM35A and AM38 engines belong to a larger class and are descended from the old M17 and M34, but these are greatly exceeded in capacity by the M40F diesel of 62.34 litres. "Particularly worth noting," says the Polish article, "is the application to the M40F engine of two dual turbo-compressors (2,700 r.p.m.) with two exhaust turbines at each side of the engine." It is of interest to learn that this big diesel has been applied to the Pe-8 and TB-7 four-engined long-range bombers.

The article makes no reference to the Russian study of German engines, though it is believed that they have been particularly interested in the highly promising 2,000-h.p. Jumo 213J, with four valves per cylinder and a three-stage supercharger, with water/methanol injection before the third stage.

German turbo-jets and liquid-rocket units have also been studied closely, and it is known that original research is being conducted on gas turbine units, some of which are reputed to have been installed in aircraft displayed at the Soviet Air Force Festival last year.



**With vulnerable parts of the AM 38 engine heavily armoured, the IL-2 Stormovik is an effective attack machine.**

Particulars of new Soviet aircraft have been scarcer than those of engines. Of the newer known types, the Tu-2 medium bomber is of the greatest interest. Twin M82 FNW engines give this type a speed approaching 350 m.p.h., and the bomb load is over 4,000 lb. This machine is probably supplementing and superseding the DD-3F, or IL-4, which was the mainstay of the Soviet medium-bomber force throughout the war. Only small quantities of TB-7 and Pe-8 four-engined, long-range bombers have been produced. These types are much inferior in performance and carrying capacity to comparable British and American bombers.

| ...L RATING | | | SERVICE RATING | | | | | Octane No. of fuel | Weight (lb) | Width (mm) | Height (mm) | Length (mm) | Aircraft fitted |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ...tput ...p.) | ...k... m) | Height (ft) | Fuel consumption (g/h.p./hr) | Output (h.p.) | R.P.M. | Boost (atm) | Height (ft) | Fuel consumption (g/h.p./hr) | | | | | | |
| 00 | 1... | s.l. | — | 90 | 1,540 | — | s.l. | 250 | 59 | 350 | 1,075 | — | — | U-2, UT-1, UT-2 |
| 45 | 1... | s.l. | 255 | 140 | 1,800 | — | s.l. | 253 | 59 | 350 | 1,075 | — | — | Yak-6 |
| 50 | 2... | 5,000 | 272/295 | 765 | 2,030 | — | — | 260/280 | 90 | 1,113 | 1,375 | — | — | I-153, I-16 |
| 00 | | 13,750 | 300/320 | 720 | | | | 280/300 | 92 | | | | | |
| 40 | 2... | 4,900 | 280/300 | 738 | 2,030 | 1.14 | 4,000 | 200/280 | 90 | 1,188 | 1,375 | — | — | PS-84, Li-2 |
| | | | | | | | | | 92 | | | | | |
| 50 | 2... | 5,000 | 272/295 | 765 | 2,030 | — | — | 260/280 | 90 | 1,210 | 1,375 | — | — | PS-84 |
| 00 | | 13,750 | 300/320 | 720 | | | | 280/300 | 92 | | | | | |
| 00 | 2... | 5,900 | 280/300 | 960 | 2,100 | 1.24 | 4,900 | 260/280 | 94 | 1,133 | 1,375 | — | — | I-16, I-153 |
| 00 | | 14,760 | 295/315 | 860 | | | 13,750 | 280/300 | | | | | | |
| 00 | 2... | 13,100 | 280/315 | 990 | 2,300 | — | 13,100 | 250/280 | 92 | 1,585 | 1,293 | — | — | IL-4 (DB-3F), Su-2 |
| 00 | | 19,650 | 300/315 | 900 | | | 19,650 | 265/295 | | | | | | |
| 40 | 2... | 11,450 | — | — | — | — | — | — | 92 | — | 1,293 | — | — | Su-2 |
| 40 | | 19,650 | | | | | | | | | | | | |
| 40 | 2... | 6,700 | — | — | — | — | — | — | 90 | 1,950 | 1,260 | — | — | La-5, Pe-8 |
| 30 | | 17,700 | | | | | | | | | | | | |
| 50 | 2... | 5,400 | — | — | — | — | — | — | 90 | 1,985 | 1,260 | — | — | La-5, Tu-2 |
| 50 | | 15,250 | | | | | | | | | | | | |
| 00 | 2... | 6,550 | — | 990 | 2,600 | 1.24 | 6,550 | 268 | 94 | 1,265 | 777 | 960 | 2,030 | Yak-1, Lagg-3, AR-2, R-2, |
| 50 | | 13,100 | | 945 | | | 13,100 | 288 | 95 | | | | | Yak-4, Pe-2, Pe-3 |
| 50 | 2... | 2,600 | — | — | — | — | — | — | 94 | 1,350 | 777 | 960 | 2,030 | Yak-7B, Yak-9 |
| 30 | | 8,850 | | | | | | | 95 | | | | | |
| 00 | 2... | 6,500 | — | — | — | — | — | — | 94 | — | 777 | 960 | 2,030 | — |
| 50 | | 21,000 | | | | | | | 95 | | | | | |
| 00 | 2... | 5,500 | — | — | — | — | — | — | 94 | 1,650 | 777 | 960 | 2,030 | Yak-11 |
| 00 | | 14,760 | | | | | | | 95 | | | | | |
| 00 | 2... | 19,650 | 300 | 1,150 | 2,050 | 1.35 | 22,950 | 270 | 95 | 1,840 | 875 | 1,080 | 2,290 | Pe-8, TB-7, Mig-1, -3 |
| | | | 315 | | | | | 285 | | | | | | |
| 50 | 2... | 6,550 | 285 | 1,410 | 2,150 | 1.55 | 9,800 | 270 | 95 | 1,892 | 875 | 1,080 | 2,290 | IL-2 |
| | | | 305 | | | | | 285 | | | | | | |
| 50 | 2... | 6,550 | 285 | 1,410 | 2,150 | 1.55 | 9,800 | 270 | 95 | 1,892 | 875 | 1,080 | 2,290 | IL-2 |
| | | | 305 | | | | | 285 | | | | | | |
| 50 | 1... | 19,650 | 200 | — | — | — | — | — | — | 2,645 | 1,100 | 1,250 | 2,200 | Pe-8, TB-7 |

# DERWENT V—100-HOUR TEST

## *Neat Fuel used for Twenty Five-hour Periods : Hot and Cold Starting Trials*

IN a recent development test to obtain production clearance for alternative turbine blade materials, and to get running experience of the use of neat fuel (i.e., without the addition of lubricating oil), the Rolls-Royce Company ran a Derwent V engine for over 100 hours. In the 100-hour period 43 hours running was done at 3,000 lb thrust, 20 hours at 3,500 lb, and the remaining 37 hours at thrusts varying from 3,000 lb to 500 lb.

The test was planned in 20 five-hour cycles, each cycle being run non-stop but separated by long and short cooling periods for the purpose of starting trials. At the start of the test, performance curves were plotted for comparison with curves taken after the 10th and 20th cycles. The figures indicate that the loss in engine performance at the end of the 10th cycle (50 hr) was less than 1 per cent of the maximum thrust; and at the end of the 20th cycle only 1.43 per cent.

The total oil consumption figure for the whole test was 2.25 pints which gave the amazingly low average of 0.00195 pt/hr. For comparison, the oil consumption of a jet-engine has hitherto been of the order of 4 to 5 gal/hr at cruising thrust, all the oil being burnt with the fuel.

If the use of neat fuel is accepted by the Air Ministry, it will not only result in a useful saving of oil but also a saving in time and manpower for refuelling of jet-propelled aircraft.

Starting trials, which formed part of the test, consisted mainly of hot and cold starts to check the response of the engine to extreme conditions. A hot start is defined as one made within 15 minutes of shut-down, and a cold start as one made at least 2 hours after shut-down. Out of over 100 starts only one false start was recorded.

Included in Rolls-Royce jet-engine test schedules is an overspeed test to prove that the safety factor of turbine wheels is unimpaired after prolonged periods of running. For this test the engine r.p.m. is increased to 3 per cent above the standard combat r.p.m., the actual speed being 15,150 r.p.m. This results in a rise in jet pipe temperature to 706 deg C., that is, 26 deg above the permissible maximum for service operation. Four of these overspeed tests were completed on the test run, and the engine showed no signs of distress.

A Rotol auxiliary gear box carrying a Dowty pump, Pesco vacuum pump and a Rotax generator, were driven by the engine throughout the test and all the units functioned satisfactorily.

### WESTLAND HELICOPTORS

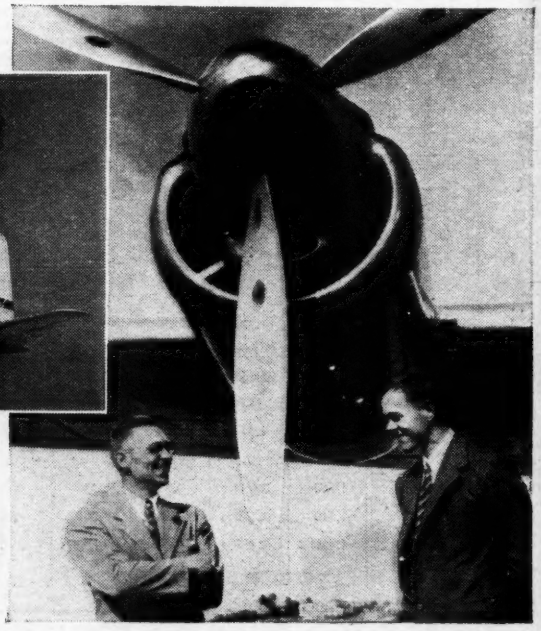
ARRANGEMENTS have been completed whereby Westland Aircraft, Ltd., will build in this country the Sikorsky S-51 type of helicopter. Mr. J. M. Barr, of the United Aircraft Corporation, and Mr. B. L. Whelan, general manager of the Sikorsky Division, are now in this country to make the necessary preparations for manufacture. Technicians from Westlands will be sent to the Sikorsky works in America for training and for collecting all detail information about the machine.

It will be recollected that Westlands are not newcomers to the rotating-wing field. Many years ago they built the Westland-Lepere gyroplane, but official interest was somewhat lukewarm and nothing much came of the venture. This time the firm has the approval of the Ministry of Supply, and it may be expected that progress will be rapid and that the Westland-built S-51 will appear before very long not only in England but in European countries.

With a gross weight of some 5,000 lb., and a useful load of 1,250 lb., the S-51 has seating accommodation for pilot and three passengers. The maximum speed is just over 100 m.p.h., and the cruising speed 80 m.p.h. Service ceiling is 13,000ft, and hovering ceiling 3,500ft. The American S-51 has a Pratt and Whitney Wasp Junior engine, but the Westland machine is to be fitted with the 500 h.p Alvis Leonides. A picture of the S-51 appears on p. 90.

### AIRLINE MERGER

BRITISH SOUTH AMERICAN AIRWAYS is taking over a substantial block of British West Indian Airways' shares, the latter company becoming an associate of the British Corporation. B.S.A.A. intends to extend its services in the Caribbean area, and the two airlines will organize a network of trunk and feeder routes in that area. B.S.A.A. also announces that the price of air-mail to South and Central America is now reduced by 3d per half ounce. Another survey flight, under the command of A.V-M. Bennett, is being made by B.S.A.A. to South America. The purpose of this flight is to open a new route linking Lima and Trinidad with the existing services from this country.



**EUROPEAN DEBUT : (Above) The first of Trans-Canada Air Lines' fleet of D.C-4M transports. The second production model is expected in this country next week when Canadair, who are responsible for the conversion, hope to demonstrate its capabilities to Dominion, Ministry and airline officials who are known to be interested. On test this combination of American, Canadian and British industry has proved to have an excellent performance. The D.C-4M is, powered by four Rolls-Royce Universal Power Plants built round Merlin 620s. (Right) Mr. J. T. Bain, technical superintendent of T.C.A., and Mr. E. Warlaw Davies, of the Rolls-Royce Canadian office.**

# Helicopter Operation

## *Some Problems and Their Effect on Design Discussed : The Importance of Reducing Structure Weight*

The first Autogiro to be flown in this country was piloted by Capt. Frank Courtney. The rotor was started by a cable wound over a drum.

THE lecture delivered by Wing Commander Reginald Brie to the Helicopter Association on January 18th was largely a plea for making an effort to save structure weight. As an example of how even a very small saving in weight can have a marked effect on performance, he quoted the instance of the C.30 Autogiro, in which the removal of just one gallon of oil, or 10lb in weight, prior to a special demonstration, made a great difference to the general handling of the machine.

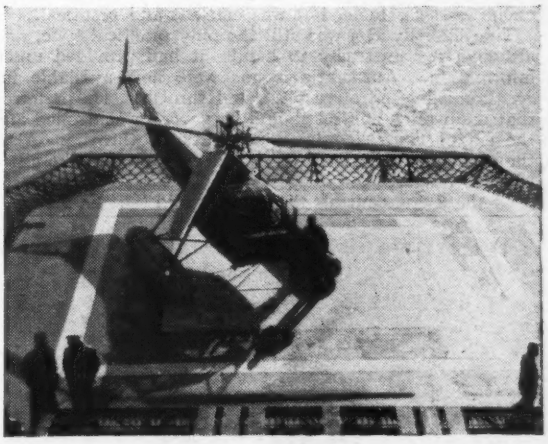
W/C. Brie recalled that it was almost a quarter of a century since Lt. Gomez Spencer, of the Spanish Army, made the first successful Autogiro flight, and thought it would be profitable to look back on the past and try to learn some lessons from it. He paid a warm tribute to the man whose tenacity of purpose and foresight had laid the foundations on which the helicopter now stands, the late Juan de la Cierva.

Although it was reasonable to consider the helicopter a logical development of the gyroplane, it did not follow that development had proceeded along entirely rational lines. Whether or not the helicopter was a better type than the gyroplane depended upon the point of view from which they were judged. It was not only more complicated mechanically, but also more difficult to fly. No helicopter could be considered safe unless it could land in autorotative flight after a power failure.

### Autogiro to Helicopter

The direct-take-off Autogiro, or, as we used to call it in this journal, the jump-start Autogiro, was a step towards the helicopter take-off without run, but the transition from static to airborne conditions was too abrupt. The "towering take-off" of the Hafner gyroplane provided an acceptable alternative. But the real key to slow-speed flying was the ability to hover in still air. The helicopter had bridged the last remaining gap in the slow-speed range. W/C. Brie grew quite lyrical when contemplating "that gentle levitation clear of the ground; the effortless pause motionless in space, and the thistledown-like landing on one's own shadow—this is slow-motion flying in its purest and most elegant form, the practical attainment of which will always be associated with the name of Igor Sikorsky."

In attaining this optimum at one end of the performance scale, a penalty had to be paid at the other. No helicopter so far could be landed without power with the facility normal to the Autogiro. The manœuvres associated with an autorotational descent and landing at present called for an unusually high degree of skill in pilot-



A Sikorsky R-4 on the after deck of M/V *Daghestan* during tests in Long Island Sound. Brie's sprung platform is just in front of the machine.

A C.30 fitted with skis. W/C. Brie pleaded for abolition of the conventional undercarriage.

age. Until disc loading could be reduced to a more reasonable value an unnecessary hazard was imposed.

The too-rapid loss of height due to the high disc loading was entirely due to the mechanical complexity and extra structural weight involved in applying continuous power to the rotor system, and was a major part of the penalty paid for the privilege of hovering.

By way of showing that refinements in detail design did not necessarily lead to reduction in structure weight, W/C. Brie gave some data from which lessons might be learned for the future. The data are given in the table. All aircraft were two-seaters, and each incorporated some refinement to improve performance. The lecturer explained the design differences in some detail, but our readers will be able to assess them fairly readily from the data in the table.

The analysis showed that the ability to hover had so far proved an expensive luxury. The R-4 helicopter was carrying, by comparison with the C.40, added structure

## HELICOPTER OPERATION

weight equivalent to four passengers. The helicopter was roughly 1,000-lb heavier than the comparable gyroplane, and it required twice the power, with no corresponding improvement in useful load, speed, rate of climb or basic performance characteristics.

In spite of these disadvantages, the lecturer thought the helicopter well worth while, but it must be able to operate

| | AUTOGIROS | | | | HELICOPTER |
|---|---|---|---|---|---|
| | C.19 Mk. III | C.19 Mk. IV | C.30 | C.40 | R-4 |
| Refinement | | Clutch | Direct control | Direct take-off | Hovering |
| Empty wt. (lb.) ... ... | 935 | 1,057 | 1,269 | 1,350 | 2,011 |
| A-u wt. (lb.) ... ... | 1,400 | 1,550 | 1,900 | 1,950 | 2,540 |
| Horse power ... ... | 100 | 100 | 140 | 175 | 200 |
| Rotor dia. (ft.) ... ... | 35 | 34 | 37 | 40 | 38 |
| No. of blades ... ... | 4 | 3 | 3 | 3 | 3 |
| Disc loading (lb/sq. ft.) | 1.5 | 1.7 | 1.76 | 1.5 | 2.24 |
| Power ldg. (lb/hp) ... | 14 | 15.5 | 13.6 | 11.1 | 12.7 |

with facility and safety. He attached particular importance to the power-off landing characteristics, and thus to the value of disc loading which, for a given rotor diameter, was directly proportional to the weight carried. The most direct method of reducing weight was getting rid of excess structure weight. "Look after the disc loading, and the power loading will look after itself." With present knowledge the figures should be ten and two respectively, but the target ought to be 1.5lb/sq ft for the disc loading. So long as it could be made to suffice, he thought the single main rotor type preferable. The tail rotor might offend æsthetic taste, but was efficient and practical.

The Sikorsky R-4 was still the only practical type, and although it was tricky to handle it had provided much information. Automatic means were now available for synchronizing collective pitch and throttle. He preferred that main pitch control should be governor-controlled and the engine controlled by a conventional throttle. Also, the pitch of the main rotor should always be in the auto-rotative range.

Of the flying controls the lecturer said that he favoured

This R-4 was fitted with sledge-type runners, another simplified undercarriage.

Sikorsky S-51s in formation. This type is to be built in this country by Westland Aircraft.

the split-wheel type, so friction-located that hands-off flying was possible. He was in favour of all-metal rotor blades, although he was not dogmatic on the point, and outlined various means of rotor-folding and stowage.

### Operational Considerations

The primary function of the helicopter, W/C Brie said, was to bridge the gap in the facilities for travel at our disposal. The Sikorsky R-5 had lifted sixteen passengers placed outside, but a suitable design might carry half that number inside. Or the helicopter could be used as a crane for lifting heavy loads over short distances.

Next the lecturer argued that much structure weight could be saved by doing away with the orthodox undercarriage of fixed-wing aircraft. Low-pressure rubber pontoons had been used successfully on land and water, but a lighter amphibious structure should be possible.

For use on shipboard, W/C. Brie outlined schemes which, in fact, he has patented and tried-out in practice. In one such there is a rotatable platform, sprung to take the shock of alighting, and with hooks which are automatically self-locking when contact has been made, thus securing the helicopter to the ship. Something on the same lines might find applications ashore.

At present there was no intention to make the helicopter compete with fixed-wing aircraft over long routes or at high speeds, but it could be used to advantage on those time-consuming short distances between terminal airport and city centre. Speed was relative, and over distances up to 150 miles, the helicopter operating from city centre to city centre, and cruising at 80 m.p.h., could compete with fixed-wing aircraft.

W/C. Brie was not in favour, at present, of easing for helicopters the restrictions on flying over towns. But this would mean twin-engined machines. Practical experience was necessary, and before organizing roof-top services he thought an intensive period of experimentation desirable. This could be obtained by using a single-engined type operating from a flat-topped barge moored in the Westminster or Blackfriars area of the Thames (the latter is a suggestion with which the Editor is in full accord, as it would give him a grandstand view from his office window!). The Thames was easily followed, even in thick weather, and a forced landing could be made without endangering anyone except the occupants of the helicopter.

W/C. Brie wanted to see the development of a single large rotor, and at the other end of the scale he regretted the present neglect of the private owner. He thought the automobile industry, with its highly developed production methods, was in a good position to partake in this development.

Looking to the future, the lecturer thought the present complicated and heavy transmission system would be replaced by one in which the torqueless rotor was the starting point, but he did not venture to forecast whether the drive would be jets, rockets or some other at present obscure method.

# AVRO TUDOR II

AVRO

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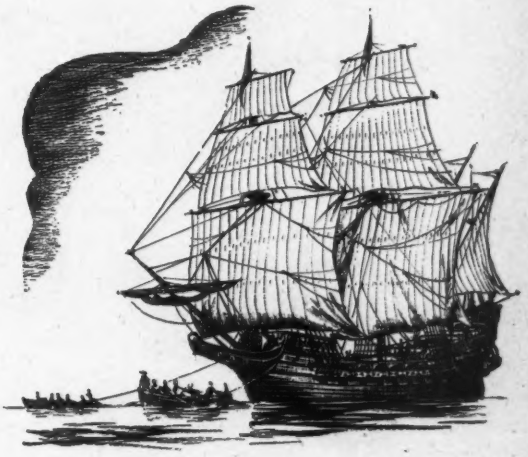

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# OP R

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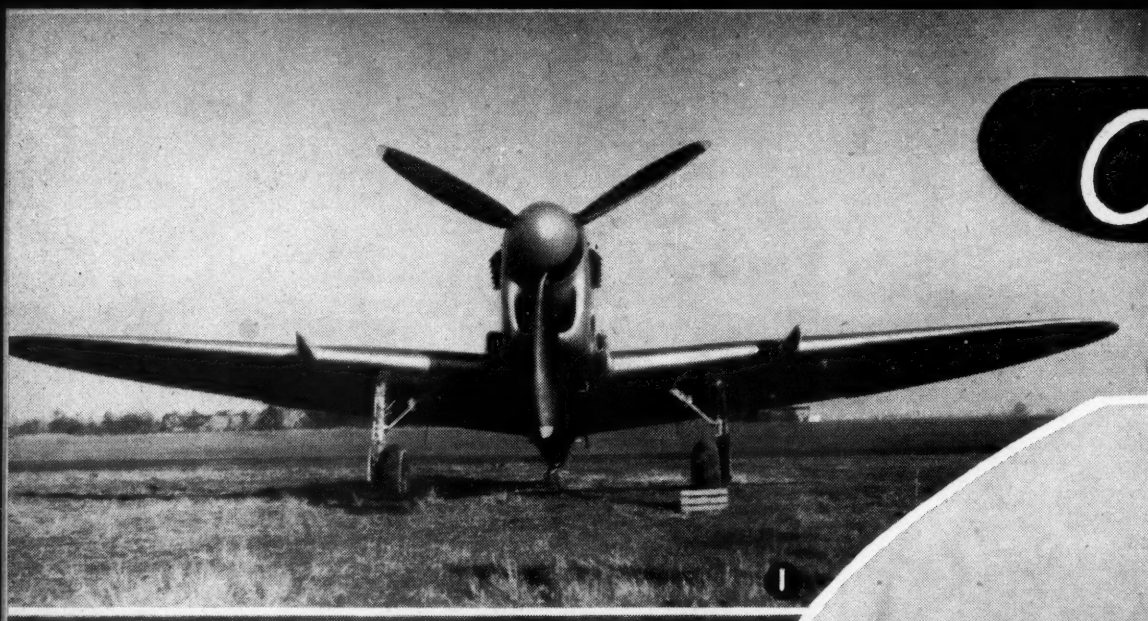
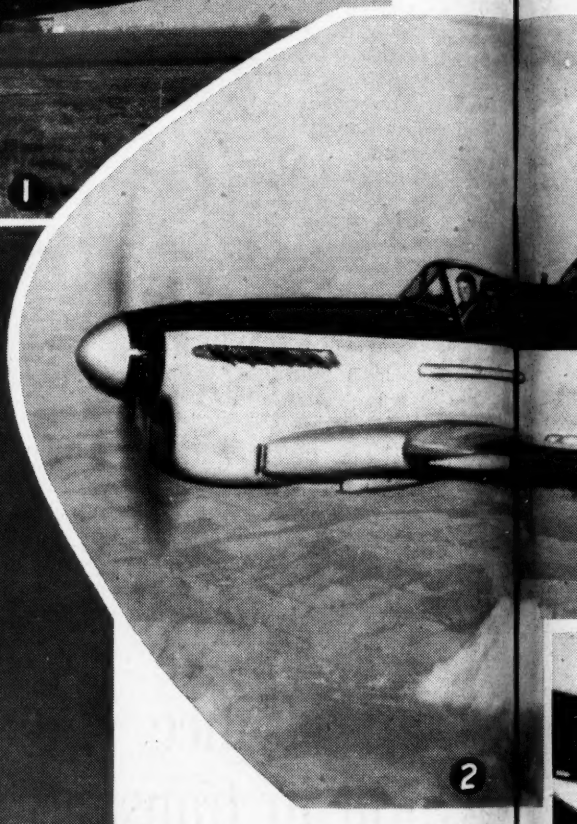




*1. In front view the Firefly Trainer differs fro operational counterpart in having only two*
*2. It will be gathered from this view that the structor's view from the rear cockpit is at adequate.*
*3. Mr. Peter Twiss presents the Trainer in view.*
*4. Mr. Duncan Menzies (right) talks Trainer Mr. Twiss.*

SINCE the Fairey Firefly Trainer was introduced last September there has been a tendency to regard it primarily as an instructional aircraft for Firefly pilots. Had a different, if less convenient, name been chosen—"Fairey Operational Trainer" for instance—this mistaken impression might never have arisen. The machine has, in fact, been developed to familiarize prospective pilots of any type of single-engined high-powered military aircraft with flying characteristics common to this class (e.g., a tendency to swing under certain conditions) and with the use of representative armament. Its intended applications may be summarized as advanced flying training, instrument-flying training, air-to-air combat, ground attack and deck-landing training.

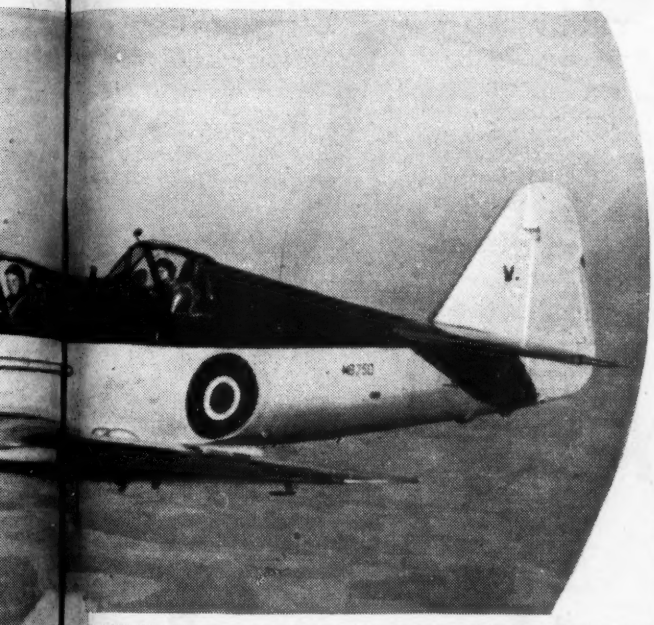
The new *Flight* pictures on these pages show the Firefly Trainer, bearing Service markings, after its return from a tour of British and Continental stations with Mr. Duncan Menzies, one-time Fairey test pilot and now in charge of service and liaison, as pilot. When the photographs were taken it was flown by Lt. Peter Twiss, D.S.C.

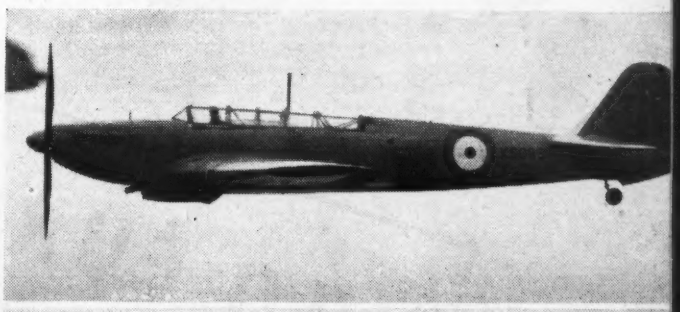
The sequence of comparative side views is included to show how the Trainer is related to the operational Firefly fighter-reconnaissance aircraft, which in turn can trace their ancestry through the Fulmar back to the P.4/34 light

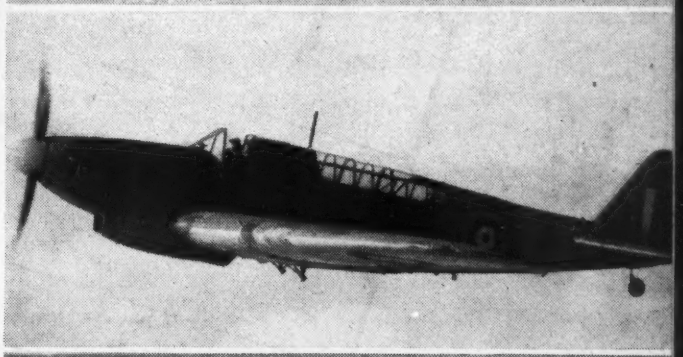
# PRATIONAL TRAINER

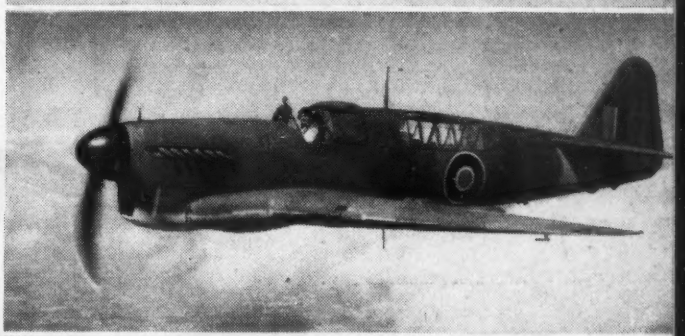
## The ...ual-control Firefly Returns from a Demonstration Tour

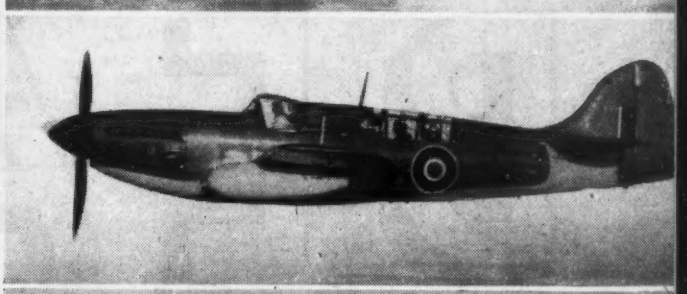
FAIREY EVOLUTION : From top to bottom are the Fairey P. 4/34 ; the Fulmar, developed from it ; the Firefly I ; Firefly IV ; and Firefly Trainer (based on Firefly I.)

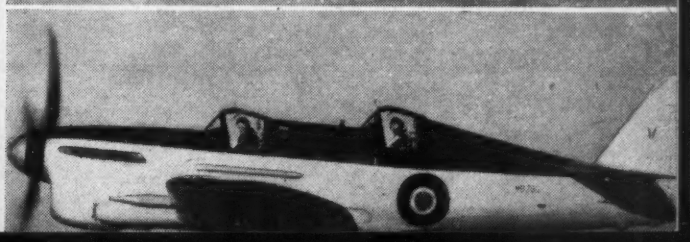












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## OPERATIONAL TRAINER

bomber, or "baby Battle" as it was mistakenly dubbed.

After clearance at the A. & A.E.E., Boscombe Down, the Trainer, in charge of Mr. Menzies, set out for the Advanced Flying School, R.N.A.S. Hinstock; the Navy's Operational Flying School at Lossiemouth; the Deck-Landing Training and Deck-Landing Control Officer Training Station at Milltown; and the School of Naval Warfare at St. Merryn. In France the machine was flown by French test pilots at Les Mureaux, and in Holland by pilots of the Netherlands Navy at the Operational Flying School, Valkenborg.

Mr. Menzies confirmed on his travels that a relatively high percentage of mishaps occur as a result of incorrect handling, on or near the ground, by pupils unaccustomed to the "feel" of modern high-performance fighters with relatively high wing loadings. An average pupil may need four hours or more to familiarize himself with a modern fighter, and expensive accidents are not infrequent.

The Firefly Trainer differs essentially from the Mk I fighter-reconnaissance machine in having the rear cockpit raised 12in above the normal position and in having two, instead of four, 20-mm British Hispano guns. This armament, of course, is adequate for gunnery training. It is possible to carry R.P.s or bombs as on the first-line aircraft, and dive-bombing and R.P. firing results should certainly benefit as the instructor is able to note the manner in which the pupil brings his sight to bear.

Apart from offering instruction in instrument-flying, the Firefly seems to provide an ideal means of making periodic checks on instrument-flying proficiency. In air-to-air combat, as in R.P. firing and bombing, the instructor can aid in perfecting the pupil's technique of approach and break-away. Finally, having the full deck-landing equipment carried by the operational Firefly, the Trainer enables instruction to be given in carrier approach and landing technique.

*"Indicator" Discusses Topics of the Day*

# To-morrow is Not Another Day

## *Some Implications of Really High-speed Air Travel : Structure and Passenger Loadings : End of the Guess and God Technique*

SLOWLY but surely—and just as Einstein's and Böhr's theories of matter and space eventually reached the ordinary person in somewhat garbled form—some of the facts and difficulties of high-speed air travel are beginning to leak out. In a year or two, and probably when the technicians find that they really *have*, after all, solved most of the problems, the knowledgeable chap in the local will have reached the point of discussing gust loadings, bump conditions at high levels and the faults of radio approach systems. That is how it always has been.

In the meantime, I feel that the worst might well be understood now so that too much will not be expected too quickly and the eventual achievement involved in the safe and regular operation of a 500-m.p.h. air service will be fully appreciated. As Dr. Spüffing recently remarked, it will be necessary for passengers to hold on to their hats very tightly when passing the speed of sound; furthermore, it will be necessary for these hats—and the passengers' bowels—to be held even more tightly at very much lower speeds unless the greatest care is exercised in flight-planning. And the stresses on the hats and bowels will, all the time, be repeated in the aircraft's structure.

I have certain very powerful recollections of the physical meaning even of a mere 450 m.p.h. in an aircraft which is passing through mildly rough patches of air. With everything stowed safely and while wearing a Sutton harness pulled down as tightly as it was possible to do so, the effects were little short of frightening. Having convinced oneself of the improbability that one would actually part company with the aircraft, it was still quite impossible to feel convinced that the wings wouldn't part company with the fuselage. Meanwhile, an otherwise directionally stable machine might start a rhythmic weaving motion, which it was impossible to combat with accuracy, and one wondered about the strength of the back parts.

When the particular cubic area of roughness had been finally passed, one rejoiced not so much in the skill of the designer, the care of the constructor and the reliability of aerodynamicist's guessings as in the essential flexibility of structures in general. I won't go into the gust-loading situation—even if I was capable of such an erudite exposition—but it is obvious that the faster the aircraft the more sudden and violent are the changes in the air forces involved. As a matter of interest, I believe that the record-breaking Meteor, even in conditions which would be considered to be quite smooth by normal standards, was suffering accelerations of the order of 6G during some of its practice runs. In the earlier attempt at Herne Bay the pilots waited week after week for smooth air, and were very lucky to find such conditions as soon as they did. At speeds over 500 m.p.h. even the faint ripples caused by a gentle off-shore wind were quite shattering in their effects.

Of course, the obvious answer to all this is that these high-speed long-range transports must fly really high. But bumps are met even at 30,000ft over to tops of cumulus and, in any case, the aircraft cannot actually start its flight at operating height. There is, indeed, no positive proof that rough air will not be met at very much greater heights; we are only guessing that it is always smooth at 50,000ft. Fortunately, the temperature of the atmosphere appears to remain more or less constant over about 36,000ft, so that, subject to the successful pressurization and conditioning of the interior and to the satisfactory operation of jet units at high levels, there are no reasonable Mach number limits to the altitude at which an aircraft can fly above this figure. Even so, at 36,000ft an aircraft flying at a true speed of 500 m.p.h. is facing Mach number conditions expressed by the figure 0.75—which is quite high enough from the design point of view. It would be necessary for the aircraft concerned to have good flying and handling characteristics at a Mach number very much higher than this in order to be on the safe side.

### Long Range/Short Duration

There are other parallel considerations, too. Any pure jet high-speed transport will have a long range only *at* this high speed—its actual endurance will be comparatively limited. Consequently, if it is to have a safe reserve of miles in hand there can be no loitering during the climb, while passing through bumpy air, or, perhaps, while being forced to fly at comparatively low levels under intermediate levels which may be icing too heavily for a climb to be possible. The flight-plan will need to be rigidly held, or the schedule abandoned.

There is one good feature here. If an Atlantic crossing can be made, say, in five hours, the meteorological forecasts over such a short period are likely to be accurate and

## TO-MORROW IS NOT ANOTHER DAY

the crews will be working, to all intents and purposes, on "actuals." A favourable five-hour period should be forecast with almost complete certainty, and even a delay of twelve or twenty-four hours would not, overall, be a very serious matter to the passengers. Sheer speed may thus save the regularity day in long-distance air travel.

Meanwhile, the radio and radar technicians have four years or more during which they may improve navigation and approach facilities to suit the new conditions. Systems which would be good enough for cruising speeds of 150 m.p.h. and approach speeds of 90 m.p.h. or so, are already proving themselves unsuitable for present-day aircraft. Everything happens far too quickly, and unless and until really reliable automatic approach aids are available the situation in bad conditions is more than the normal human reflexes can handle with reliability. An error in millibar correction, or a deviation of course between the outer and inner markers may produce last-second circumstances which, at 130 m.p.h. or more, cannot be combated. Even a G.C.A. controller will need to talk fast and very well. It is reasonable to suppose that the safe approach speed of a 500 m.p.h. transport will be higher and that the figure will certainly rise in the years to come.

### Accident Possibilities

With one or two comparatively unimportant exceptions all the air transport accidents of the past half-year have been directly or indirectly caused by "navigational," or simple judgment errors in difficult or near-impossible conditions. I have no idea of the standards of meteorological and radio facilities available in China, but the recent day's holocaust, when three transports successively failed to make the terminal airfields when the weather closed in, *could* be repeated here. With the advantage of so many possible diversionary fields the chances are thousands to one against, but they cannot be altogether discounted. Freak weather conditions might close every airfield by zero visibility and ground-level icing conditions—then they really would need to get the Fido burners alight at any cost in fuel rationing for the private motorist.

Whatever the finally selected approach system may be, I feel that for safe operation, this must be natural enough for the pilot's reflexes to work quite without conscious volition. Hence, of course, the indirect value of an aid of the Fido type—with which, it seems, more than half the assistance offered is simply visual. In the past there has been far too great a tendency for the technicians to produce a series of signals or indications and then to expect the pilot to learn to use them, whether natural or not. However well practised a pilot may be in any particular technique, the translation of aural or visual signals into terms of control movements, the effects of which have had to be taught in their relation to the instrument readings, offer too many possibilities of error. Of all present-day methods only the talk-down G.C.A. system has the virtue of removing one link in the chain of translations over which so many errors are possible.

### Fog-piercing Vision

Short of the provision for the pilot of a direct radar picture of the world at large and of the runway in particular, there seems to be no possibility that this chain may be reduced in length to the single link of visual flying. Meanwhile the aircraft may be instable in one particular axis, there may be a certain amount of ice to increase this instability, and, apart from undercarriage lowering, flap extending and approach boost-adjustment, there are a dozen and one other jobs to be done. That there are so comparatively few bad-weather approach accidents shows how well aircraft captains do their job; that there are virtually no cases of nervous breakdown amongst transport aircrews shows the stamina of the human nervous system.

Whatever happens in the future over this approach guidance problem, I feel that it should be attacked rather more firmly from the pilot's side of the picture. If necessary, let us first produce natural indications—which might be part and parcel of the ordinary blind-flying indications—and then see how these can be made to work. One has often been shown a new type of gyro instrument which has been almost criminally unnatural in first appearance and been told that there seemed to be no other way of arranging the indications and that "the pilot will soon learn how to do it." There is too much to learn. If simplification is only possible at the expense of even more complication, then we must suffer this—with the still further increase in costs involved.

### PACKARD GAS TURBINES

IT was made known some time ago that the Packard Company in America were developing a gas turbine engine, and it is now reported that the first design has run successfully on its initial tests. Development work is taking place by arrangement with the Air Material Command at Willow Run and also at Toledo where a new gas turbine laboratory equipped with supersonic wind tunnels, and facilities for testing at extremes of temperature and altitude is nearing completion.

### IRAQI FURIES

THIRTY-FOUR Hawker Fury fighters with Bristol Centaurus XVIII engines are to be supplied to the Iraqi Government by Hawker Aircraft, Ltd. Four are to be converted to two-seater dual-control trainers and the first deliveries should be made during the summer. Further reference to the Fury Trainer is made on page 103.

The single-seater type, to be known as Fury "Baghdad," will be equipped to carry various external loads, e.g., two 1,000-lb bombs, various combinations of bombs, drop-tanks and R.P.s, or smoke-curtain installations. Moreover, provision is being made for two F.24 cameras, one vertical and the other oblique, which, in conjunction with two 90-gallon drop tanks, will enable the Fury "Baghdad" to operate as a long-range PR-fighter.

Another feature is provision for removing each wing, outboard of the guns. This will simplify salvage and major maintenance operations and should prove well worthwhile in countries where facilities for major repairs are more scattered than in the United Kingdom.

*"Flight" photograph.*

**SHOWING HIM ROUND: Capt. John B. Pearson, U.S.N., the new American Assistant Naval Attaché for Air in London, being shown a Coastal Command Brigand by Mr. A. J. Pegg, Bristol's Assistant Chief Test Pilot. Capt. Pearson spent the years 1940 to 1944 developing U.S. naval fighters and then went to the Pacific as Chief of Staff to a Logistic Command. He is a pilot of 15 years standing.**

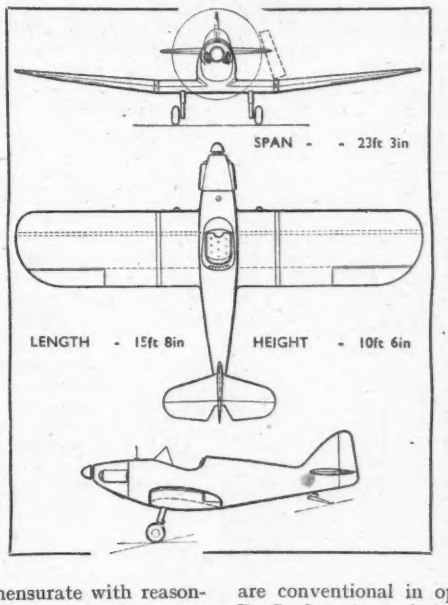
# The Wren "Goldcrest"

## *Ultra-light Single-seater with Flat-four Two-Stroke Engine : A Newcomer to Tempt the Owner-Pilot*

WHEN Risteard Mac Roibin wrote his article, "Encouragement for Fools," in *Flight*, August 22nd last, he aroused a good deal of latent interest in the really simple, ultra-light, single-seater aircraft—an interest which has been reflected in the correspondence columns of this journal ever since. It is true that Mr. Mac Roibin's special plea was for an unconventionally simple aircraft which the amateur constructor might build for himself, but a large proportion of those who have since written to *Flight* on the subject have definitely favoured a more conventional approach to the idea than did Mr. Mac Roibin. Nevertheless, the question remains, how much of the interest displayed is purely academic and how much represents an actual market for what might loosely be described as an aerial equivalent of the sporting solo motorcycle?

Partly in an attempt to find the answer to this question, The Wren Aircraft Co., Ltd., of Carlisle, has evolved a small single-seater, the Wren "Goldcrest," powered by an engine of their own design which, from the brief description and illustrations at present available, seems to offer distinct possibilities to the potential owner-pilot in search of low-powered solo flight.

This machine has been designed with the special requirements of the amateur owner-pilot well in mind—simplicity and easy maintenance, durability of airframe and engine, minimum hangar space, ease of handling on the ground as well as in the air, and, of course, low operating costs commensurate with reasonable performance to permit serious travel as well as mere "fun flying." How far these laudable objectives have been achieved will be seen when the production version completes its various tests, but it is clear from certain features of the design that some of them, at any rate, are "built-in" qualities. Ease of handling on the ground and compact storage, for example, are indicated by an overall length of 15ft 8in and the fact that the aircraft is designed to be towed with the wings carried in pannier cradles alongside the fuselage, thus giving a width on the road of only 6½ft. This also means that the little Wren can be stored in a garage of normal size, while for overnight hangarage the wings fold upwards.




As will be seen from the accompanying photograph and G.A. drawings, the Wren is a conventional low-wing monoplane of attractive proportions, and when the makers' own engine is fitted (as shown in the drawings) it will be even neater about the nose than is the prototype seen in the photograph, since the latter is temporarily fitted with a 25 h.p. inverted, air-cooled, two-cylinder in-line Scott Flying Squirrel two-stroke engine for preliminary flying tests of the airframe. The Wren engine, a batch of which is now being made, is a 30 h.p. horizontally opposed, four-cylinder two-stroke unit (of striking simplicity) which permits a more symmetrical line and much cleaner entry.

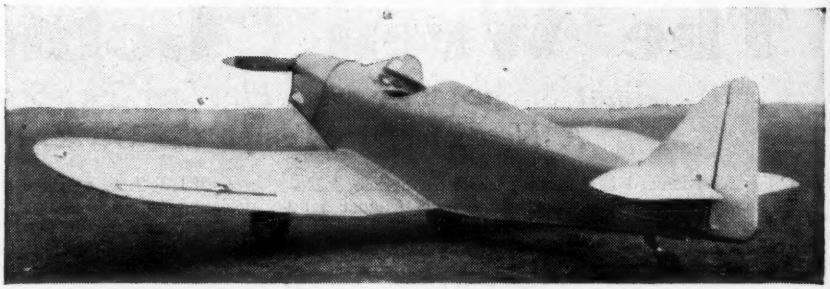
Full constructional details of the aircraft are not at the moment available, but it can be said that the first prototype had an all-wood airframe and weighed less than 500 lb. From experience with this, a second and outwardly similar prototype weighing 600 lb was designed to much more robust standards—including aerobatics category—features of which are the non-corrosive main fuselage structure and a semi-hydraulic undercarriage, with recoil damper, giving a deflection of 8in. Controls are conventional in operation, but in the words of Mr. R. G. Carr (one of the firm's two directors) "a considerable degree of austerity is practised which eliminates almost every known gadget."

It is the new Wren Series III engine, however, which arouses the greatest interest, since the airframe has been evolved around this unit.

More than one correspondent to *Flight* has lamented the fact that the British aircraft industry showed no interest in the very light, very simple, and comparatively low-powered engine suitable for the ultra-light single-seater. The new Wren certainly proves that there is one exception, and its ultimate performance will be awaited with considerable interest. The drawings of this power unit are not intended to show more than its general layout and disposition of the main components, but the following brief description will indicate to what lengths the designer has gone in his search for robust simplicity with resultant easy and inexpensive manufacture, main-

**PROTOTYPE : This head-on view of the little "Goldcrest", with a human figure for size comparison, gives a good idea of its compact dimensions. But the 25 h.p. Scott engine and the strut-braced undercarriage are replaced on the production model by the flat-four Wren power unit and a cantilever undercarriage of equally generous width.**

## THE WREN "GOLDCREST"



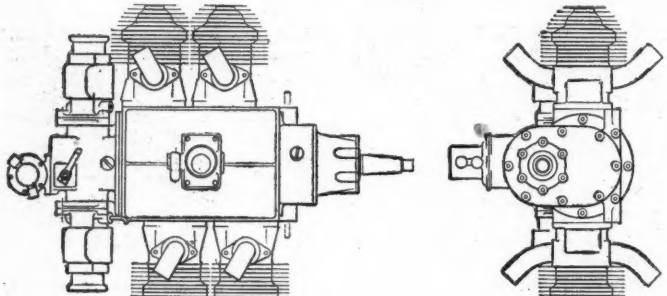
TINY BUT TRIM: The pleasing lines of the new Wren single-seater will appeal to the owner-pilot. The nicely proportioned control surfaces should result in good manœuvrability.

maintenance and operation.

It is a normally aspirated flat-four two-stroke in which the opposing cylinders fire together (i.e., it has the same firing interval as an in-line two-stroke or a 4-cylinder four-stroke engine). The mixture is supplied by a Zenith down-draught carburettor direct to the plain centre-bearing of the crankshaft, and distribution ports in the crankshaft admit it alternately to the two crankcase compartments where it is compressed by the inward movement of the pairs of pistons (normal crankcase compression).

### Uniform Heat Distribution

Transfer to the combustion chambers is via a port belt in which the transfer jets alternate with the exhaust ports, thus ensuring a uniform heat distribution around the cylinder walls and preventing distortion of the cylinder liners. Cylinder heads are hemispherical, and flat-topped pistons are used, thus eliminating the hot-spots from which the old deflector type of two-stroke piston is so prone to suffer under continuous load. Being flat topped, the pistons can also be machined all over. The engine is, in fact, symmetrical, except for its off-set gudgeon pins which provide that degree of *desaxé* which has a desirable effect on the port timing, and, *per se*, the engine's flexibility.



STURDY SIMPLICITY: Designed for reliability and low upkeep costs, the flat-four 2-stroke Wren engine develops 35 h.p. for take-off and is claimed to be immune from four-stroking. The sketches merely show the general layout of the power unit.

Lubrication is provided by a constant supply of oil fed from a separate tank to the centre bearing by a metering oil pump interconnected to the throttle, but for the first 50 hours of the engine's life this is augmented by a 5 per cent addition of oil to the petrol for upper-cylinder lubrication. There would probably be no harm in continuing the petroil addition indefinitely, but it is apt to be rather messy and is not really necessary after the running-in period. The makers are emphatic, however, that there must be no economizing with the metered oil; in fact they seal the adjustment and all guarantees become void if it is tampered with. It must be noted that by interconnecting the oil pump with the throttle, the supply of lubricant (it is, of course a total loss system) is varied according to the load—which, incidentally, is also a good feature of the petroil system.

Some idea of the unit's sturdiness may be gained from the fact that its massive four-throw crankshaft accounts for 9½lb of the engine's total weight of 85lb. The ignition unit is coupled to the rear end of the crankshaft, and the left-handed tractor airscrew is driven via a 0.64 reduction gear. The crankshaft is hardened and ground to take the split, three-track roller-bearing big-ends and, as the unit is intended to run at a maximum of 4,000 r.p.m. for take-off, all reciprocating parts are "mirror" balanced.

Motor cycling two-stroke enthusiasts will be particularly attracted by the makers' claim that this engine will not four-stroke unless the mixture is deliberately fouled, and will idle evenly down to 500 r.p.m. driving a 6½lb airscrew! They also say that the throttle can be flicked wide open, when the pick-up is instantaneous; there is no hesitancy or choking.

Reference to the data panel will show that the bore (2.75in) is greater than the stroke (2.5in) which makes for a comparatively slow piston speed despite the high revolutions—a good feature when reliability and long life are to be combined with reasonable power output. The consumption figures given by the makers indicate the low operating cost and should be considered in conjunction with the compression ratio of 8 to 1, and the fact that 73 octane petrol is the intended fuel.

Ordinary maintenance should certainly be well within the scope of the average owner-pilot, for the few accessories are very "get-at-able" and there are, of course, no valves, valve-gear, or other highly stressed details calling for expert attention. Thus a top overhaul could surely be tackled by anyone capable of holding a spanner, leaving only a complete overhaul (which should be at very infrequent intervals) to call in the services of a licensed aircraft engineer or the makers.

Even top overhauls should be agreeably far apart, for the hemispherical heads are reported to give a high degree of turbulence with very rapid and complete combustion. So much so that, says Mr. Carr, "no flame is visible at the ports under any conditions, and, moreover, the exhaust gas is relatively cool. (We understand that it is possible to insert the fingers in the short exhaust stubs for several seconds at full throttle without discomfort.) Incidentally, the exhaust pipes have been designed to break down the harmonics which normally exist in the pipe and cylinder, and interfere with the slow-running and idling of a two-stroke engine; so here lies part of the engine's immunity from four-stroking.

Makers' performance figures give a top speed of 95 m.p.h., a cruising speed of 75 m.p.h. and a landing speed of 42 m.p.h. Wing loading is 6.2 lb/sq. ft.

**ENGINE DATA**

| | | | |
|---|---|---|---|
| Type... | Flat four, 2-stroke | Take-off | ... 35 h.p. at 4,000 r.p.m. |
| Bore ... ... | 2.75in | Max. normal | 30 h.p. at 3,500 r.p.m. |
| Stroke ... ... | 2.5in | Cruising | ... 25 h.p. at 2,800 r.p.m. |
| Volume ... ... | 973 c.c. | Fuel | 0.62 lb/b.h.p./hr at 3,500 r.p.m. |
| Compression ... | 8 to 1 | | 0.54 lb/b.h.p./hr at 2,800 r.p.m. |
| Gear ratio ... ... | 0.64 | | |
| Weight of engine ... | 85 lb. | | |

## *Three Corporations Form New Company: Civil Aircraft Radar Equipment*

MONTREAL AIRPORT: The terminal building at Dorval, used by B.O.A.C. as the maintenance base for Constellations.

# CIVIL AVIATION NEWS

## SPREAD OF DISEASE BY AIR TRAVEL

### *An International Organization Suggested*

INFECTIOUS diseases have always spread along the trade routes of the world, whatever the mode and speed of transport. To-day it is the speed of travel on land and in the air which adds danger to the spread of disease from endemic to non-endemic areas. Dr. G. M. Findlay, late consulting physician to the West African Command, discusses this important subject in a recent issue of the *British Medical Journal*. The diseases which are especially feared in relation to spread by air traffic are yellow fever and malaria. There are, however, others.

Yellow fever may be carried by an infected mosquito or by a person incubating the disease, and the endemic yellow-fever zones in Africa and South America are now crossed by a number of air routes. In fact, the portion of the earth where yellow fever is endemic is too large to be absolutely avoided by long-distance aircraft at present, although, as Dr. Findlay observes, it may be possible in the future for aircraft to fly, for example, direct from Cairo to South Africa without touching-down inside the yellow-fever area.

Experiments made before the war showed that mosquitoes could survive journeys by air of over 9,000 miles, in which heights of 10,000 to 12,000ft were reached. It was proved that mosquitoes free to move inside an aircraft do not necessarily leave at intermediate stops. Flies are frequent passengers in aircraft, and they also, it appears, are able to carry infectious diseases. The measures which are necessary to prevent the spread of insect-borne diseases by aircraft are, of course, well known, and if carried out properly should make risk infinitesimal. These measures include the sanitary control of airfields, aircraft, air passengers, crews and ground staff.

#### Airfield Hygiene

International airports cover great areas, and extensions to runways for larger aircraft are visualized. The existence of so many acres of flat tarmac and of large hangars means that in the tropics, during the wet season, a tremendous volume of rain water often has to be run off the airfield area. Scouring of drains and soil erosion have to be guarded against, and mosquito control must be exercised not only over the actual airfield area, but over a zone ot country extending in some directions for as much as three miles, if, during tropical storms, mosquitoes from uncontrolled areas are not to be blown on to the airfield. In any case, anti-mosquito schemes require constant vigilance, requiring a large staff, and the cost of maintenance is, consequently, high.

As Dr. Findlay remarks, the ideal method is the application of an insecticide to the inner walls of the aircraft, combined, while in flight, with some form of aerosol spray containing a rapidly acting insecticide such as pyrethrum. During the war, when the Freon bomb or a hand-spray was the standard equipment, disinsectization was not normally done until the aircraft had landed, and then in such a manner that insects had ample opportunity either to leave the aircraft or to remain in it alive for a further journey.

All passengers by air travelling through endemic yellow-fever zones are required to carry a certificate that they have received yellow-fever vaccination more than ten days before the date at which they enter the zone, and not longer than four years. However, at an airport a recent check of just a few passengers allowed seven different types of British yellow-fever certificates to be collected, all signed by different medical officers. Since those who examine these certificates are not always provided with specimens of these various types, or with a list of the medical officers empowered to sign such certificates, it is not surprising to learn that they have, in the past, been forged, and that it is reported on credible information that on the Continent there is a black market with a recognized tariff for these certificates. It is, therefore, quite plain that to prevent forgery only one form of yellow-fever certificate should be available, and lists of those medical officers whose signatures are accepted should be kept in every airport.

The organization which dealt with the sanitary control of airfields and aircraft during the war has now largely been dispersed, but the problem remains as urgent as ever. Many of the countries on international air routes have neither the staff nor the money to devote to matters which are not their primary concern. In view of the many loopholes which became apparent during the war, and of the meagre resources possessed by many countries for dealing with international air traffic, Dr. Findlay suggests that the only really satisfactory organization would be an international one, with an adequate staff and funds of its own. This concern, he further suggests, might be placed under the World Health Organization of the United Nations, and in close association with P.I.C.A.O.

Its functions would be: (1) To take sanitary control of all airports and areas considered to be involved in the spread of infectious diseases from endemic to non-endemic areas; (2) to control the disinsectization of all aircraft on routes where spread of infectious diseases is likely to occur; (3) to control storage of yellow-fever vaccine and its injection, and to approve institutes for the testing of vaccines; (4) to control the issue of immunization certificates. So far as the sanitary control of airfields and airfield areas are concerned, this would involve a partial abrogation of sovereignty on the part of the territories concerned, since the sanitary staff engaged in this work would be responsible not to local directors of medical services, but to the World Health Organization of the United Nations. The spread of disease can be held in check only by a scheme which is internationally sponsored and internationally controlled.

### *AIRADIOGRAMS AGAIN*

A POPULAR pre-war communication service for air passengers has been reintroduced by B.O.A.C. Passengers travelling on the Corporation's aircraft may now send messages to any part of the world. The Airadiograms, as they are called, are limited to fifteen words, including the address and signature, and will be accepted in plain language or in code. The charge for messages to addresses in the United Kingdom and Eire is 1s a word, and for addresses overseas the charge is 10½d plus the normal telegraph charges for transmission

# CIVIL AVIATION NEWS

from the United Kingdom to the country of destination. With the exception of addresses in or through North America, messages may be addressed to other persons in the same town or to the same person in different parts of the same town. In such cases the telegram, including the addresses, is charged for as a single message, with an additional copying fee of 10d for each address. At the moment there are no facilities for originating messages on the ground for travellers in aircraft. It is hoped this might be done at a later stage. B.O.A.C. have made the rule that Airadiograms will be accepted only if the aircraft is more than three hours' flying time from its destination, and they are, naturally, only acceptable subject to operational requirements.

## *PRACTICAL ASSISTANCE FOR AIR SAFETY*

IN prescribing standardized navigation and approach aids, communication systems and equipment for use on air routes all over the world, P.I.C.A.O. had to take a long-term view. When the recommendations were made it was quite plain that several years must elapse before many of the routes could be equipped with the necessary aids, and it was evident that many countries would need assistance in the provision and operation of the devices. This applies particularly to those countries who were not major participants in the war, and who, consequently, are far less advanced in the field of radio and radar.

Realizing the urgent need for facilities on the air routes, the three British Air Transport Corporations have formed, with the full approval of the Minister of Civil Aviation, a company to be known as International Aeradio Limited. Briefly, the company's objective is to install and operate telecommunication and radio aids to navigation throughout the world wherever they are required and where they would not otherwise be available. The cost of the facilities the company provide will normally be met by direct subscription from the Governments concerned, but contributions will be made in certain circumstances by those airline operators using the facilities. It is proposed, however, that the company shall be a non-profit-making concern, and it is intended to budget as accurately as possible and to assess charges on the basis of likely cost.

The results should be beneficial to both the countries providing the radio facilities and the airline operators, whether British, Dominion or foreign, and should do much to promote efficient ground services and air operations.

The initial capital of £250,000 will be held as to 30 per cent by B.O.A.C., 30 per cent by B.E.A. and 10 per cent by B.S.A.A. The balance of the share capital will be available to Dominion and foreign operators who may wish to participate in the enterprise. The directors will be nominated as to three for B.O.A.C., three for B.E.A. and one for B.S.A.A., of which the following have already been appointed:

Maj. J. R. McCrindle, O.B.E., M.C., Deputy Director General, B.O.A.C.

Sir Victor Tait, K.B.E., C.B., Technical Director of B.O.A.C.

Mr. Whitney Straight, Deputy Chairman of B.E.A., who will act as Chairman of the company.

Grp. Capt. Dudley Saward, O.B.E., now Manager of Navigation and Telecommunications for B.E.A.

Grp. Capt. Patrick de Laszlo, who is at present working for the Government on the manufacture of radar devices.

Capt. Gordon Store, Operations Manager, B.S.A.A.

## *ACCIDENT REPORT*

THE investigation into the accident to the British European Airways' Dakota which occurred near Oslo on August 7th last year has now been completed.

At 1344hr. the aircraft was in the area of Gardermoen Airport and was given by W/T. the direction in which to land. The weather at the time was 10/10th cloud with base at 1,000ft, under which the visibility was ten miles. Wind was only three miles an hour. The pilot asked if he was clear to land using the Radio Range let-down procedure, to which Gardermoen replied that he was number one for range let-down and there was no other local flying. No further wireless or radio communication was received from the aircraft. At 1357hr. the aircraft was known to fly over the Radio Range station, which is five miles north of the airport, and a few minutes later witnesses seven miles farther north heard the aircraft turn, and then after a sudden roar of engines the noise of a crash. The aircraft had, in fact, flown into trees on the eastern face of the 2,182ft high Mistberget mountain at a spot 2,040ft above sea level and about twelve miles north of the airport. At the moment of impact the aircraft was flying southwards, almost parallel with the side of the mountain. There was no evidence of pre-crash failure, but it was noticed that the Radio Range receiver was tuned to the range with the radio compass operating. There is every reason to believe that the aircraft was under control and the engines were running under power at the moment of impact. The loading, C.G. position, licences and aircraft checks were all quite in order. The Radio Range was on, and in the light of two subsequent calibration tests there is no evidence to suggest any mal-functioning or discrepancy which could, in any way, have had a bearing on the cause of the accident.

It has been revealed, however that, if the aircraft equipment was switched to compass instead of antenna, the pilot would have been at a disadvantage, since the beam north of the cone of silence would have been about 20 deg wide instead of 4 deg. This was not known at the time of the accident, but a technical instruction has since been issued to all B.E.A. aircrew.

The Radio Range equipment is largely manufactured in America, and is, consequently, scarce in this country. The equipment in this Dakota was not complete, in that the marker beacon receiver was not fitted. It was, therefore, necessary for the pilot to calculate his distances from the beacon. The procedure turn was made in approximately the expected area, but as he was on compass the western edge of the beam leg would place the aircraft dangerously near the high ground. The route instruction book gives the minimum height at the fan marker position as 3,250ft. He was, therefore, already below the minimum height.

In the opinion of the investigators the cause of the accident was an error of airmanship by the pilot in that he began his "let-down" too soon. The reason for this error must be attributed to inexperience of Radio Range flying, coupled with inadequate aircraft equipment.

It is of interest that when British European Airways was formed a special Check Flight was organized to inspect and issue instructions on all systems for navigation and blind flying throughout Europe. It is understood that the flying weather minima for Gardermoen has now been adjusted.

## *RADAR FOR STRATOCRUISERS*

AMERICAN OVERSEAS AIRLINES intend to carry a considerable amount of radar equipment in the Stratocruisers intended for the transatlantic route. The installation is being made by the aircraft manufacturers as an integral part of the aircraft. The exact type of radar to be used is not quite clear, but it is described as being capable of defining storm areas, areas of dangerous icing, high ground, and of mapping coastlines. Blind-landing assistance through the aid of ground beacons is also mentioned.

It is reasonable to assume, therefore, that the equipment will be something similar to the wartime H2S., Rebecca-type interrogator for B.A.B.S. and "Dangerous cloud and collision warning equipment" shown to P.I.C.A.O. delegates last September.

The equipment to be installed on the British Stratocruisers has not yet been completely settled, but it may be said that SCS.51 will be standard, and as a long-distance navigational aid Loran will almost certainly be included. As a further indication of future equipment in British aircraft, the Tudors will also have SCS.51 and Loran. V.H.F. radar, which is described as being able to give echoes from coastlines and is capable for short-distance navigation and homing, will also be fitted. This, presumably, is a civilianized A.S.V. At present all British land-aircraft flying with B.O.A.C. are fitted, or are being fitted, with Rebecca, for interrogation of B.A.B.S. and Eureka beacons, whilst all flying boats have A.S.V. for picking up responder beacons. The necessary ground equipment is already installed at a large number of points on the Empire routes, and plans are already in hand to install B.A.B.S. and Eureka beacons at all airfields along the routes to South Africa, India and the Far East. There is no mention, however, of such installations for the Atlantic route.

B.E.A. Vikings are fitted with military Gee; and the Yorks and Lancastrians flying with B.S.A.A. have military Gee for short-range navigation over Europe, and Rebecca for the other side of the Atlantic.

## *RELEASE FROM PRIORITY*

THE Ministry of Civil Aviation have announced that as from February 3rd the existing arrangements, whereby seats are held for priority passengers on some services operated by B.E.A., will be abolished. The services concerned are from the United Kingdom to Paris, Copenhagen, Brussels, Oslo, Lisbon, Madrid, Prague, Stockholm and Amsterdam This is a step toward normal conditions, and should give some relief

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to the rather restricted conditions in which B.E.A. are at present operating. There is no indication, however, that the Ministry intend to assist the Corporation further by demanding that Government Departments give notice of seat cancellation earlier than under the present arrangements.

## *BREVITIES*

Air Marshal Sir Roderick Carr has been appointed Divisional Controller of Aerodromes for the London area and South-East England, with effect from February 1st.

* * *

The Douglas Company have established a European Division to provide technical liaison with overseas airlines operating Douglas aircraft. The Division will be located at Haren Airfield, near Brussels, and will include a field service and a spare part stores. Of the 4,500 Douglas aircraft in service outside the United States, the majority are operated by European airlines.

* * *

A Danish delegation is now in Moscow negotiating for a service from Copenhagen to Moscow through Helsinki. It is hoped for an agreement similar to the one signed recently by Russia and Sweden.

* * *

Sir Leonard Isitt, New Zealand's director in British Commonwealth Pacific Airlines and chairman of the newly established National Airways Corporation, is in Montreal to discuss with the Australian director in B.C.P.A., Mr. A. W. Cole, the details of the proposed Canada-Australia and Canada-New Zealand air services. Discussions will be primarily with Trans-Canada Airlines, and they will also investigate the possibility of operating DC-4Ms on the Pacific route.

* * *

The enquiry by the Chief Inspector of Accidents into the Dakota accident on January 11th opens at 10 a.m. to-day at Ariel House, Strand, W.C.2. The public will be admitted.

* * *

Pan American Airways recently made a survey flight to Hong Kong in a Skymaster. Checks were made on maintenance and communication facilities along the route from San Francisco, through Honolulu, Midway, Wake, Guam, Tokio and Shanghai, and also on a route via Canton, Calcutta, Rangoon, Bangkok, Saigon, Singapore, Batavia and Manila.

* * *

During 1946 Channel Islands Airways carried over 74,000 passengers, nearly 400 tons of cargo, and more than 200 tons of post office mail. The company's previous best year was 1938, when 34,000 passengers were carried.

* * *

The Canadian Department of Health has set up a new Division to cover civil aviation. The Division, which will work in co-operation with the Department of Transport, and the R.C.A.F., in addition to carrying on research work, will draw up regulations to protect the safety, comfort and health of flying personnel from a medical standpoint. Advice will also be given on problems connected with the health of travellers by air.

* * *

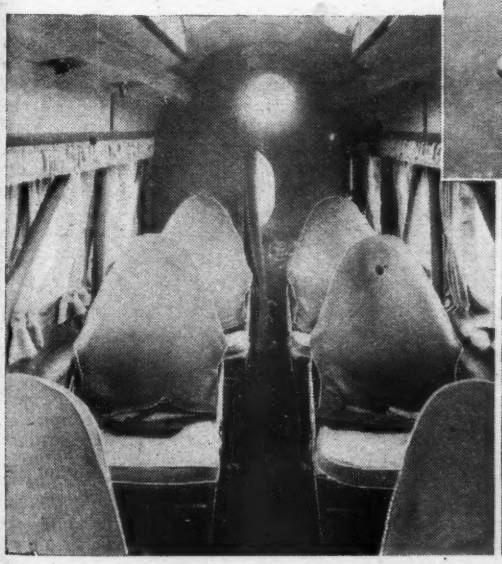
Problems of mutual interest to the American bodies, C.A.A. and C.A.B., are to be handled in future by a new combined committee. This committee will consider mutual problems and make final decisions in all matters except those requiring formal action by the C.A.B. Members of the committee have been appointed.

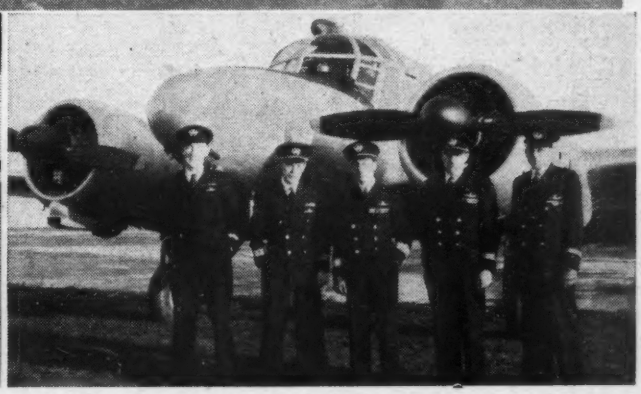
* * *

K.L.M. plan to purchase Seabee amphibians for communication purposes in the Netherlands West Indies.

## CONGO BOUND

TWO standard six-seater Avro XIXs with Armstrong-Siddeley Cheetah 15 engines have recently been delivered to the Belgian C.F.L. Company (Compagnie des Chemins de Fer du Congo Superieur aux Grands Lacs Africains). They will be based at Leopoldville and will be used for aerial survey work, the transport of mining personnel, and, to a limited extent, for charter. Below are seen the two aircraft on test before leaving this country, a view of the XIX interior, and a group of senior flying members of the C.F.L. Company. (Left to right): M. Leon Thiery, Chief Engineer; Capt. J. E. Roy, Pilot; Capt. Van Opstal, Flying Manager; Capt. A. N. Pesenaire, Pilot; Lt. R. F. H. Morlet, Chief Radio Officer. The XIX is a direct descendant of the Avro 652 of 1934 vintage, and the military version was, of course, the Anson. This versatile aircraft may have many more years of useful life, for it has been well tried and still possesses many of the characteristics required of a trainer as well as those of the light transport.





# Air Operations in Greece

## *Air Vice-Marshal D'Albiac's Despatch on a Gallant Campaign*

FROM the strategical point of view the Greek campaign can be divided into three periods. Dealing with the November-December phase, A.V-M. D'Albiac recounts the circumstances attending the declaration of war, discusses briefly the Greek problem and records, in a note on the Greek Air Force, that Greek pilots, many of whom had attended courses in England, were keen and what they lacked in modern war technique they made up for in personal bravery. Their aircraft consisted of a number of different foreign types, predominantly French and Polish, with a limited range of spares. Operationally the Greek Air Force was controlled by the General Staff and was used almost entirely in direct support of the Army.

In response to an urgent appeal for help, the British Government decided to send a contingent of the Royal Air Force to Greece from the Middle East. The force decided upon was two medium bomber squadrons, one mixed medium bomber and two-seater fighter squadron—all armed with Blenheim aircraft, and two single-seater fighter squadrons with Gladiators. On A.V-M. D'Albiac's arrival in Athens on 6th November, 1940, the advance elements of this force had already arrived and were ready for action.

*Greek pilots . . . . what they lacked in modern war technique they made up for in personal bravery.*

Every pressure was brought to bear on him to use his force in the same manner as the Greek Air Force—in close support of the land forces—but he appreciated that the best help he could give to the Greek armies was to concentrate his small bomber force on disembarkation ports being used by the Italians in Albania and important communication centres. He finally obtained agreement on this policy, and by the end of November the Italian advance had been stemmed and the Greek forces, which had by then completed their concentration, were able to take the offensive. The Greek General Staff was most appreciative of the prompt and valuable help we had been able to provide for their soldiers who, with ferocious intensity, had disputed every foot of the Greek soil, and they expressed the view that it was largely due to our assistance that the situation had become satisfactory.

One of the main difficulties the Air Vice-Marshal experienced in establishing his force, and one which was a constant handicap throughout the whole Greek campaign, was the extreme scarcity of aerodromes suitable for the employment of modern aircraft.

R.A.F. units continued to arrive during November and December and by the end of 1940 the concentration was complete. All ancillary services were provided by the Army, and this arrangement is stated to have been particularly successful. Similarly, liaison between the British forces in Greece and the Greeks was at all times close and cordial. Every evening the Air Vice-Marshal attended a conference with the C-in-C and the Greek

*LATEST of the war-time despatches by Royal Air Force Commanders to be published as a supplement to "The London Gazette" is that by A.V-M. J. H. D'Albiac, D.S.O., concerning Royal Air Force operations in Greece, from November, 1940, to April, 1941. During this period the R.A.F. in Greece was under his command. The report was submitted to the Air Officer Commanding-in-Chief, Middle East, on August 15th, 1941*

General Staff to discuss the day's operations and to plan the programme of work for his force, and for the Greek Air Force, for the following day. These nightly meetings, attended frequently by the King and General Metaxas, were carried on throughout the R.A.F.'s stay in Greece.

By the time the Greeks had taken the offensive and had driven all the Italian forces off Greek territory, in some sectors even advancing into Albania, our continued bombing of Valona and Durazzo and the focal points on the enemy's rearward system was having a serious effect on his supply organization. In addition, during moonlight periods, our bomber effort, using Wellingtons from Egypt, was being extended to targets on the mainland of Italy, and considerable damage was being inflicted on ports on both sides of the Adriatic. Our fighters were establishing a definite

*A change of air policy was forced upon us during the battle of Valona.*

moral if not numerical superiority.

Serious operational difficulties, largely due to the weather, were encountered during the period January to February, 1941. Enemy opposition was stronger and more modern fighters were being encountered.

The Air Vice-Marshal goes on to refer to his visit to Cairo, where he discussed a reinforcement plan envisaging a total force in Greece of fourteen squadrons. At about the same time conferences were held to discuss the possibility of sending a British expeditionary force to Greece, but the Greek General Staff, on learning the limited size of the force that could be made available, decided that its presence would only tend to provoke Germany, whilst it was not strong enough to be able to provide any very material support.

The battle of Valona was interesting inasmuch as a change of air policy was forced upon us. Air Vice-Marshal D'Albiac argued against close support by his bombers, but was reminded that the morale of some Greek soldiers had been severely shaken by enemy bombing, and that success might depend on the stimulus afforded by seeing Italians treated in the same way.

During February the first six Hurricanes appeared, and their first flight over Athens was greeted with great enthusiasm. On their first sortie they shot down four enemy aircraft and later, in company with Gladiators, destroyed 27 e. a. without loss.

The opening of the final phase of the campaign (March to April, 1941) was notable for the decision to send a

*During moonlight periods our bomber effort, using Wellingtons from Egypt, was extended to targets on the mainland of Italy.*

British expeditionary force to the country. Arrangements were made for a defensive line to be prepared in suitable country, west of Salonika, covering the Larissa plain. The arrival of the British force and the organization of a new front meant a further reorganization of the R.A.F. component, which was difficult because all squadrons were much below strength. A "refreshing interlude" was the battle of Cape Matapan, in which all our bombing squadrons took part. Six Swordfish arrived on the 11th March and operated against Valona and Durazzo harbours. Several ships were sunk and more were hit while the Fleet Air Arm was operating in Greece.

At the time of the German invasion the R.A.F. component was organized as follows:

A Western Wing—consisting of one bomber and one Gladiator squadron supporting the Greeks in Albania.

An Eastern Wing—consisting of two bomber and one Hurricane fighter squadrons supporting the Anglo-Greek forces facing the German advance.

In the Athens area was one bomber squadron and one fighter squadron in process of re-arming with Hurricanes.

On the 6th April, when the German forces were on the march, 12 Hurricanes met 20 Me 109s and shot down

five without loss, disposing of "any anxiety or over-cautiousness which the Squadron Commander had felt about the change-over from Italians to Germans." Subsequent operations by Hurricanes, Blenheims and Wellingtons are discussed before the Air Vice-Marshal turns his attention to the first withdrawal (9th to 15th April). While the main effort of the German Air Force was being directed against the R.A.F., it became necessary to withdraw the Western Wing.

*Our pilots were working at extreme range, challenging untold odds and, at times, with no ammunition left, chasing enemy aircraft.*

At the time of the second withdrawal (15th to 24th April) it was decided to abolish the Eastern Wing and to control all operations from Athens. A Greek Gladiator squadron was destroyed by straffing, but Hurricanes which were absent from the airfield escaped.

After the decision to evacuate, the whole weight of the G.A.F. was turned on the Athens area, and there was no alternative but to save what air crews and material remained. Squadrons ferried the remainder of the personnel of their squadrons to Crete.

The fighters having been withdrawn to the Athens area, the utmost efforts were made to give the maximum protection to our harassed troops. On this subject, the Air Vice-Marshal writes: "All our machines were working to maximum capacity. Many of our pilots were working at extreme range, challenging untold odds and, at times, after they had used up their ammunition, pursuing enemy aircraft engaged in ground-straffing troops . . ."

"Even after having been shot down, our fighter pilots would immediately take the air in aircraft which had been riddled with bullets and by all normal standards were totally unserviceable. The courage of these men never failed nor looked like failing. Each day their fellows died, each day they stepped into their battered aircraft, not without a sensation of fear but quite undismayed.

"On 22nd April I sent the remaining Hurricanes to Argos. From here I intended that they should cover the evacuation of the British Army, but the German air attack became so concentrated that after a number of Hurricanes had been destroyed on the ground on 23rd April, the remainder were ordered to leave for Crete. In Crete, Blenheim fighter patrols were organized to cover the ships evacuating the troops from the beaches. These escorts were maintained throughout the evacuation without respite, and I consider it was due largely to their efforts that such a large proportion of the total British forces in Greece were evacuated.

*After having been shot down, our fighter pilots would immediately take the air in aircraft which had been riddled with bullets.*

"A reference to the evacuation would not be complete without a tribute being paid to the flying boats, both of the R.A.F. and the B.O.A.C. These boats carried out magnificent work ferrying parties of airmen and soldiers both from the mainland to Crete and from Crete to Egypt."

The record number of personnel carried in a single Sunderland was 84.

# "BOMBER" HARRIS TELLS HIS STORY

## *A Personalized Account of Bomber Command's Offensive*

OF the great military figures of the last war (which, on reflection, seems to have produced as many powerful personalities as earlier and less mechanized struggles) Marshal of the Royal Air Force Sir Arthur Harris, G.C.B., O.B.E., A.F.C.—"Bert," or "Butch" or "Bomber" Harris, A.O.C.-in-C. Bomber Command—holds a unique place if only because he abhorred publicity.

"I did my utmost during the war," he writes in his new book*, "to avoid any sort of publicity for remarks by myself; in fact I considerably annoyed many representatives of the Press by refusing to see them or hold Press conferences." His decision on this matter—as on yet weightier considerations!—he made for what he felt were good and sufficient reasons; these he now sets down without rancour and with unshaken conviction.

### Press and Strain

Much of what was going on in the mind of Bomber Harris during the days when the Press champed or pined for an utterance by him doubtless remains his secret, and rightly so, for a man who braves the buffeting of a bloody and arduous campaign having no parallel in world strife must on many matters keep his own counsel. "I wonder," he writes, "if the frightful mental strain of commanding a large air force in war can ever be realized except by the very few who have experienced it."

Nevertheless, the broad outline of his great task he draws in, completely and incisively, adding such touches of detail as to show himself not as a ruthless ogre or blustering butcher, as his enemies often portrayed him, but as a studious and strong-willed R.A.F. officer who had been on his guard against Jack-in-Office officialdom ever since in India his D.H.9s were obliged to take off for operations on wheels with naked rims and fly with single-ignition while new dual-ignition engines were being sold by the Disposal Board as junk.

**Marshal of the Royal Air Force Sir Arthur Harris, G.C.B., O.B.E., A.F.C.**

Since his Staff College days Harris had fervently expounded the potentialities of bombing and when, from the roof of the Air Ministry, he watched the burning of the City, he was convinced that a bomber offensive of adequate weight, with the right kind of bombs, would, if continued long enough, be something that no country in the world could endure. This, incidentally, was the one occasion on which he admits to having felt vengeful. "They are sowing the wind," he said to Lord Portal, having fetched him from his office to observe the blaze.

### "4,000 Heavies"

These two had talked in terms of four-thousand British heavy bombers but when, early in 1942, Harris found that he had to prove quickly what a bomber force could do to enemy war potential he had a force of 50 heavies and 250 mediums. With these, in the suggested time of three months, he was to destroy the four cities of the Ruhr.

Here it may be recorded that the switch from precision to area bombing, from attacking key factories or even sections of factories, to bombing towns as a whole, had been made some time before he took over Bomber Command. The principle of attacking morale was half-admitted, though concentration on this was rejected. As the Marshal puts it ". . . the idea was to keep on at small targets . . . but not to mind if we missed them, or at any rate to regard a miss as useful provided that it disturbed morale."

* *Bomber Offensive. By Sir Arthur Harris. Collins, 21s.*

# CORRESPONDENCE

*The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.*

## PRIVATE FLYING

### *Nationality and Red Tape*

MANY of us who have been demobbed from the R.A.F. or other Allied Forces naturally wish to continue to fly, but are met with every opposition. We believe in flying, and wish to encourage others to do so, but it really seems that red tape and general officialdom wishes to crush all initiative and to hamper private flying.

For instance, when a man lives in a country of which he is not a national (no matter that he has probably lived there for many years) he is not allowed to buy an aircraft in the country of his residence, and register it in the normal way, as he might a motor car.

One is informed that one is only allowed to register an aircraft in the country of which one is a national, and that the periodic inspections have to be arranged for in that country. Moreover, the type of aircraft that one might be allowed to purchase must be previously agreed upon by the said countries before the aircraft is allowed to be put on the rolls.

Surely, with the ever increasing demand for flying by the ordinary man in the street, these obviously antiquated rules should be revised. Is this not a matter that should be brought up before the International Air Association?

O. POULSEN, Flt. Lt., R.A.F.

## THE METRIC SYSTEM

### *A Plea from a Continental reader*

I FULLY agree with those who have written appreciatingly of your excellent drawings, articles and photographs. This explains why *Flight* is so popular a journal on the Continent, too. You, Mr. Editor, know the exact number of copies that cross the North Sea and the Channel each week. I see only that *Flight* is available in almost every bookshop in the Netherlands and that many of my friends have a subscription or buy it more or less regularly. And judging from certain passages of your journal, you must have many readers in other Continental countries, too.

But, *noblesse oblige!* On the Continent we have adopted the metric system. An aircraft flying at 616 m.p.h. does not tell us very much until we have converted to km/hr, not to mention pt/b.h.p./hr and lb/sq ft! I don't want to discuss the advantages of the metric system, only to illustrate them by two examples: When fine limits are required in your country and in the U.S.A. they are expressed in thousandths of an inch (thus, semi-metric!) and judging from the questions by B.B.C. quiz-masters the British system must have its difficulties not only for us but for your countrymen, too!

And now a proposal which, I suppose, will be supported by many "metric" readers. Would it be possible for you, Mr. Editor, to put the metric value between brackets (and in italics, to prevent any confusion) after the figure in your system? I don't believe that this requires much more paper. We are a very modest people, and I think it sufficient to give only the number and omit the dimension by making, once and for all, the agreement that where you write m.p.h. the metric value that follows is in km/hr, and so on.

A second argument you may have against it is that conversion takes much time. But now we have to do that, and often in places where tables or a slide rule are not present. But I believe that a man who does this little job regularly, and who is provided with suitable tables, will not need more than an hour weekly for a normal issue of *Flight*.

In this connection I emphasize that the only shortcoming in your excellent Paris-Show issues was the absence of conversion into the metric system. Especially in these issues, it might not have been omitted.

Hoping that you will take the above as constructive criticism to elevate your journal to a still higher level.

Eindhoven (Netherlands). J. WYCHMAN.

[In the years between the wars we made it a practice, in publishing aircraft data, to give both the British and the metric figures. During the war we were compelled by paper shortage to economize on space in every way possible, and the practice had to be discontinued. However, we will try to comply with our correspondent's request so far as possible in the future, but it is not always practicable to include both sets of figures. For instance, if the double-page tables of data of British military and civil aircraft in our issue of November 14th, 1946, were to have included the metric figures, they would either have had to be duplicated (for which space could not be afforded), or the amount of information given would have had to be seriously curtailed. We believe the majority of our continental readers prefer the more complete data which the omission of the metric conversions made possible.—ED.]

## AIRCRAFT ACCIDENTS

### *Mileage an Important Factor*

I HAVE read the article "Misleading Statistics" by your American reader Mr. Blondin, dealing with the presentation of aircraft accident statistics compared with those presented by other forms of transport, and I am more than a little surprised to see that you agree with him.

The fundamental fact that your correspondent has overlooked is that the risk to the passenger incurred in using any form of transport is dependent not only on the number of journeys undertaken but also on the length of the journeys, therefore, the number of passenger miles per fatality is a perfectly logical index for measuring the comparative incidence of fatal accidents.

The fact that the older forms of transport prefer to quote their accident risk in the less logical form of passengers carried per fatality is hardly an adequate reason for your correspondent's castigation of aircraft operator's accident statistics.

In comparing the fatal accident risk between various modes of transport, the same basis must obviously be used. As already pointed out, passenger miles per fatality is the truer index, but either method would give an equally good comparison IF the average length of journeys was approximately the same for each mode of transport. This is far from being the case as the following figures of average length of journey show:—

| | | | |
|---|---|---|---|
| All British Main Line Railways .. | 1938 | 15.94 | miles |
| London Passenger Transport Board .. .. .. .. | 1938 | | |
| Railways .. .. .. .. | | 4.70 | ,, |
| Trams .. .. .. .. | | 1.88 | ,, |
| Trolleybuses .. .. .. | | 2.00 | ,, |
| British European Airways—August to November .. .. .. | 1946 | 465.6 | ,, |

From these figures it will be seen that the journey of the average B.E.A. passenger is some 30 times that of a main line railway passenger and 100 times that of a passenger in the L.P.T.B. trains.

I agree with your original editorial in which you suggested that there are other alternative methods of presenting the accident risk in air operations, but none of these are suitable for making comparisons with other forms of transport.

J. L. S. STONEMAN.
(Statistician, British European Airways).

## FLYING JOBS

### *A "B" Licence is Not Enough*

MAY I quote a passage from the "Service Aviation" section in *Flight*, January 9th: "The main air transport corporations and charter companies are already in urgent need of qualified pilots, but a 'B' licence is essential."

May I suggest that it should have said "*multi- engine* pilots."

I have held a "B" licence for three months now, have had a thousand hours on fast single types with experience on twins and jet aircraft. My assessments in the R.A.F. were above average and I never had an accident. However, I have advertised numerous times for a flying job and written to about all the companies who are listed, but always receive the same reply—that only pilots with 1,000 hours on twins or multis are required.

It was a standing joke in the R.A.F. at one time that a fighter pilot flew around quite oblivious of where he was, and relied more or less on instinct or the local farmer in whose field he was presumed to land, to find his way home.

Surely this turned out to be entirely untrue as the war progressed, and the fighter pilot not only had to act as his

# CORRESPONDENCE

own navigator, but had really to make big decisions regarding fuel and range problems as the trips grew longer and longer

I have known my squadron on more than one occasion climb through 20,000ft of cloud, complete a mission and return home over 10/10ths without the aid of an elaborate chart table or long-range W/T.

I should have thought that the "rely on yourself" experience of a single-engined pilot would go a long way to develop the qualities expected of a captain of aircraft—if only a little aircraft.

However, my old C.G.I. warned me and I should have known better than to disregard his advice; but I would appreciate your giving a few words of fatherly advice to single-engine pilots who think a job is theirs for the asking when they have obtained a "B" licence.

EX-FIGHTER BOY.

## THE FLYING CITIZEN

### *Publicise the Accident-free Operations*

FURTHER to the letters which have been appearing in the Correspondence columns of *Flight*, and also in view of the crop of accidents that appear to have taken place during the last few days, I feel that the time has come when the general public should be more fully informed of the amount of accident-free flying which actually takes place.

The headlines in the Press after each unfortunate accident cannot but deter the general public, and I would suggest that a reasonable way to counteract this would be for all the operating companies to group their figures and publish them, say monthly, in the public Press, giving the total number of passengers leaving and arriving at the main airports, and total mileages flown.

F. W. G.

## PROSPECTS AND PORTENTS

### *"Indicator" taken to Task: Dr. Spüffing's Invention Anti-dated*

WE were disappointed to find, in your otherwise admirable account of Dr. Spüffing's lecture to the Arts and Sciences Society of Wormwood Scrubbs, no reference to the fact that the Doctor's claims to originality in this field rest on more than doubtful foundations, since his conclusions were to a great extent anticipated by Abimelech Jones, whose pioneer researches in the 'eighties of the last century have been sadly neglected, and by Professor Treihardt Rabisch, whose aeronautical investigations are very little known, being somewhat difficult of access, buried as they are amid a mass of unrelated matters of which they were, in effect, only a by-product.

Abimelech Jones was a prominent citizen of Wishwosh, near Medicine Hat, but situated exactly on the 49th parallel and possessing, in consequence, the unique distinction of having two Mayors and two Corporations with equal and co-extensive but independent jurisdictions. Jones' nationality has therefore never been clearly established. His *magnum opus, Birds are a Back-number—or the Scientific Flying Machine Constructor*, was entirely lost for many years, the manuscript and nearly all the original and only edition (eleven copies) having been destroyed in a disastrous fire—following an over-ambitious experiment by his grandson (see below) on the properties of rocket propellants—in the author's workshop in 1892; but a copy was recently brought to light in the Library of Congress, where it had inadvertently been included among the files of the *Wishwosh Eagle and Commercial Intelligencer* for the years 1888 to 1900.

This work, based largely on the exhaustive experiments of Abimelech's grandson, Jehoiachim Jethro Jones, Jr., then aged nine, describes in the minutest detail the low-aspect-ratio, keeled, all-wing monoplane which Dr. Spüffing claims as his invention. Spüffing's mathematical treatment, including, of course, the famous Spüffing Number, is new, but the basic physical theory, expressed perhaps less rigorously but none the less effectively, is all to be found in Jones' treatise.

Of Rabisch all that need be said is that he was, for some years towards the end of Queen Victoria's reign, curator of the Ethnological Museum of Goalong, N.S.W., and subsequently Professor of Comparative Savagery in his native Bôgúsz, where he died at a great age in 1911. His manuscript notes (unpublished) were discovered in the University Beer Cellar while this was being converted into an Allied Control Commission District H.Q., and were found to contain, amongst lengthy speculations on aboriginal-culture complexes, an exact description of Spüffing's unsymmetrical, swept-back autorotative aircraft, and a comprehensive discussion of its aerodynamic characteristics and operational possibilities. It is interesting to note that Rabisch did not favour the ball-bearing cabin idea, since he maintained that autorotation would have a soothing effect on the occupants.

That Dr. Spüffing himself should have failed to acknowledge his debt to these original sources, notwithstanding the publication of copious abstracts from both Jones' and Rabisch's work in the transactions of the Montgolfier Institute itself, is a matter for no surprise, seeing that he is a Ruritanian refugee having political affiliations with the unpopular Top Dead Centre Party (in liquidation), whose only constructive measure when in power was the abolition of copyright.

May we, in conclusion, point out an inaccuracy (possibly a printer's error) in your quotation of the fundamental Spüffing formula? The term to the left of the equality sign should contain the factor $\sqrt{2}$ in the denominator, since the Spüffing Number is now, by International Agreement, taken to be twice the multiplier of the Lift coefficient in the expression for terminal supersonic velocity gradient outside the boundary layer (extrapolated to infinity). Strictly speaking, the factor $C_L$ should have the suffix zero. In the general form of the equation there is, of course, an arbitrary constant, which, however, approaches asymptotically to unity in practical cases, i.e., except when the derivative of the ionisation potential of the fluid with respect to $S_{kr}$ is in the instalibity region, or the surface is infinitely rough.

For security reasons it is necessary that we request leave to withhold our full names, and therefore beg to sign ourselves

M.E.V.E.P. and F.J.R.C.

["Indicator" writes: "I accept the reproof, but in self-defence it should be explained that the work of Jones and Rabisch was mentioned during the discussion which followed Dr. Spüffing's lecture. The quality of their conclusions was, however, so strongly criticized by the Doctor that I thought it better, perhaps, to leave the matter open. It seems probable that experiments on types such as the S.427 spearhead had been carried out, even before the 'eighties, by so-far-unnamed students of fundamental aerodynamic research."]

## ULTRA-LIGHT AIRCRAFT

### *Some Degree of Supervision Advisable*

YOUR correspondent, Mr. J. A. Allan (*Flight*, December 26th), deplores the application of the certificate system to gliders, but there are a few rays of hope. First, the A.R.B. consists of representatives of the users, the makers and the Government. One may expect them to apply some reasonable safeguards without being unnecessarily restrictive if they are to serve *all* the interests they represent.

Secondly, gliders also have to "carry trusting passengers" as Mr. Allan puts it, and one can hardly deny to the casual user of club machines some measure of assurance that the machine he flies is sound. In Switzerland, where one cannot find a single shoddy glider, the control is in the hands of a Government inspector (Capt. W. Ledermann), who is an early "Silver C" and has the interests of the glider pilot at heart. The result is the finest fleet of gliders in any country. The same applies in Czechoslovakia.

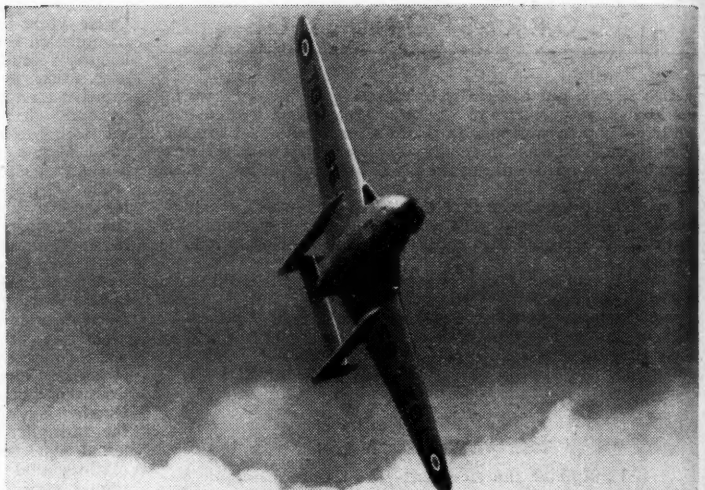
Thirdly, the British Gliding Association is composed entirely of hard-bitten gliding enthusiasts and is helping to frame the regulations so as to avoid undue restriction.

To sum up, I would say that some measure of supervision is desirable, but it must be tempered with common sense and consideration (as, indeed, should be the application of any law). I know all too well that the A.R.B. inspectors can make or avoid trouble by their individual attitude, and we shall want some form of appeal in cases of doubt. We have to steer a middle course between extreme laxity and futile officialdom that knows no tolerance. So while we must avoid any further obstacles to the gliding community, I feel that a sensible measure of control will keep machines out of trouble and make out efforts all the more praiseworthy.

Let us not despair for, I believe, the new control will be reasonable and will lead to sound machines, particularly when the Government decides to assist the finest of all basic flying training, gliding and soaring.

J. CECIL RICE, A.R.Ae.S
(Leicestershire Gliding Club).

*Royal Air Force and Naval Aviation News and Announcements*



**BATTING IT: It remains to be seen if any future de Havilland jet fighters will be given "bat" names like the Vampire, seen here in a high-speed turn. A comparatively light wing loading—about 32lb./sq.ft.—contributes to the excellent manœuvrability of this type.**

# SERVICE AVIATION

## *Appointments*

AIR CHIEF MARSHAL SIR ARTHUR BARRATT has relinquished the appointment of Inspector-General of the R.A.F., which he has held since October, 1945. He has been succeeded by Air Marshal Sir Norman Bottomley, formerly A.O.C.-in-C., Bomber Command.

Air Marshal Sir Hugh Saunders has been appointed A.O.C.-in-C., Bomber Command.

The Air Ministry announces the appointment of Air Vice-Marshal Charles Edward Neville Guest, as Air Officer Commanding No. 1 Group, Bomber Command.

Air Vice-Marshal Guest has been Senior Air Staff Officer, Air Command, South-East Asia (now known as Air Command, Far East), and was formerly Air Officer, Transport Command, South-East Asia, from October, 1945. For two years previously he was Air Officer Commanding No. 229 Group (India) after having been Deputy-Director of Organization at the Air Ministry from September, 1942.

Enlisting in the ranks of the R.A.F. in September, 1918, shortly before his 18th birthday, Air Vice-Marshal Guest was commissioned in 1922. He was born in October, 1900, at Worcester, and was educated at King Edward High School, Birmingham.

The promotion to temporary Air Marshal of Air Vice-Marshal George Jones, Chief of Staff of the Royal Australian Air Force, has been announced by Mr. Arthur Samuel Drakeford, Australian Air Minister. Other promotions included Group Captains (temporary Air Commodores) Joseph Hewitt, F. M. Bladin, E. C. Wackett, and Mackinolty to temporary Air Vice-Marshals.

The Air Ministry has approved the appointment of G/C. J. A. Cecil Wright, A.F.C., T.D., D.L., J.P., as Honorary Air Commodore of No. 605 (County of Warwick) Squadron, Auxiliary Air Force.

G/C. Wright is a former Commanding Officer of No. 605 Squadron.

## *Nene-Vampire Reaches 51,000ft*

WING COMMANDER "JOHNNIE" BALDWIN, who commands "A" Squadron at the A. and A.E.E., Boscombe Down, has reached 51,000ft—possibly higher—in a de Havilland Vampire intercepter powered by a Rolls-Royce Nene turbine jet. He has thus handsomely exceeded the previous British jet height "record" of 46,500ft, established by Mr. Philip Stanbury last year on a Gloster Meteor IV, and the corresponding American "record" of 47,000-odd feet held by the Bell YP-59A Airacomet.

The world's landplane record for height—56,032ft—has remained unbeaten since October 2nd, 1938, when it was established by Lt. Col. Mario Pezzi in a Caproni biplane with a Piaggio radial engine. It was suggested in *Flight*, of January 9th, that the A. and A.E.E. "record" of 48,200ft (held by a Spitfire) might soon go by the board.

## *U.S. Safety Officers Here*

COL. JOHN W. PERSONS, chief of the Headquarters Flying Safety Service of the U.S.A.A.F., and his aide, Capt. W. R. Saunders, are visiting this country to study R.A.F. accident prevention methods and be shown other activities of the Service. The visit is in return of that paid to the U.S.A. last year by A. Cdre. A. C. H. Sharp, D.S.O., A.F.C., Director of Accident Prevention at the Air Ministry.

Col. Persons and Capt. Saunders received a fine welcome at an informal reception held in the Air Council Chambers on Friday, January 17th. The hosts were A. Cdre. Sharp and members of his staff. Present at the reception were the Chief of Air Staff, Marshal of the Royal Air Force Lord Tedder, heads of departments in the Air Ministry, and A.O.s C.-in-C. of Coastal, Transport, Reserve and Flying Training Commands. Among the senior officers from the Air Ministry were Air Marshal Sir Leslie N. Hollinghurst, A.V-M. Sir Basil E. Embry, A.V-M. S. N. Boothman and A. Cdre. D. F. W. Atcherley. A.V-M. E. J. Cuckney came from the Ministry of Supply, and A. Cdre. Vernon Brown from the Ministry of Civil Aviation. General Curtiss, formerly Chief of Staff to General Spaatz, was also present.

Arrangements have been made for Col. Persons and Capt. Saunders to fly various types of R.A.F. aircraft, including the Meteor and Vampire. They will have discussions with A. Cdre. J. W. F. Merer, Director of Allied Air Co-operation and Foreign Liaison, Air Ministry; A. Cdre. Sharp; G/C. A. F. Anderson, D.S.O., D.F.C., Deputy Director of Accident Prevention; and Col. J. Griffiths, the United States Air Attaché. Included in their itinerary are R.A.F. Stations Odiham, Bassingbourne, Upwood, Marham, West Raynham and Hullavington.

## *A Polish Occasion*

THE fine residential club of the Polish Air Force Association, at 14, Collingham Gardens, S.W.5, was opened by Madame Sikorska, patron of the Association, last Thursday. His Worship Bishop Gawlina consecrated the building, and the ceremony was attended by high-ranking Polish officers, including General Anders and General Kopanski.

The Association hopes to aid members to secure suitable employment in this country or abroad, and ultimately aims to found branches in countries where numbers of members find themselves.

At Collingham Gardens the accommodation and facilities for refreshment, relaxation and entertainment seem in every way adequate.

## *No. 209 Hong Kong Squadron*

DUE to the reduction in the number of first-line R.A.F. squadrons the Hong Kong "gift" squadron—No. 114—has recently been disbanded. The Colonial Office, however, has asked that the association between Hong Kong and the R.A.F. should be continued by the nomination of another squadron to bear

the name and the Air Ministry has selected No. 209 Flying Boat Squadron, in Air Command, Far East, to bear the Hong Kong title. No. 209 Squadron has had close associations with Hong Kong since the Japanese surrender and it is probable that a flight will eventually be based there.

## Manchester University Sqn.

MANCHESTER Corporation Airports Committee, as controllers of Barton Airport, have consented to allow Manchester University Air Squadron to land, take-off and to park their machines at that airport.

## Appointment

THE Air Ministry announces the appointment of A.V-M. Edgar James Kingston-McCloughry, C.B.E., D.S.O., D.F.C., as Air Officer Commanding No. 18 Group, Coastal Command.

A.V-M. Kingston-McCloughry has been Senior Air Staff Officer at Air Headquarters, India, since April, 1946, and was previously R.A.F. representative on the Government of India Defence Committee from November, 1944. Before that he was at the Headquarters of the Allied Expeditionary Air Force, as assistant to the Deputy Senior Air Staff Officer, from December, 1943, after having been from February, 1942, Air Officer Commanding No. 44 Group.

Born in Adelaide, South Australia, in 1896, he was educated at St. Peter's College, Adelaide, Adelaide University, and Trinity College, Cambridge.

## An "American Farmer" Echo

IT is announced that F/L. R. M. Mathieson, captain of the Liberator which located the U.S. freighter *American Farmer* on August 2nd, last year, following her collision with the *William J. Riddle*, has received the King's commendation for valuable service in the air.

Flt. Lt. Mathieson took off at first light on August 2nd and located the derelict ship 700 miles out in the Atlantic. After reporting its position and taking photographs he flew on to Largens in the Azores. On its return flight to base at R.A.F. Station St. Eval on August 4th, the Liberator again located the vessel. By this time several surface vessels had reached her and eventually she proceeded to Falmouth.

## Permanent Commissions

ALL the applications made by R.A.F. officers for permanent commissions have now been examined and all those officers selected under present procedure will have been informed within the next few weeks. The remaining candidates will remain eligible for selection for extended service commissions.

Out of some 30,000 applications, the R.A.F. Permanent Commission Selection Board has selected nearly 3,000 officers for permanent commissions and nearly 13,000 for extended service commissions.

Normally, in the future, officers who were commissioned during the war will only be granted permanent commissions if they hold extended service commissions. In addition, the future field for selections will be broadened to include regular airmen, aircrew who have extended their service, and officers on extended service and short service commissions.

G.D. branch officers who are not qualified pilots will, it is stated, be fairly considered for permanent commissions even if it has not been possible to give them pilot training by the time their application is under consideration.

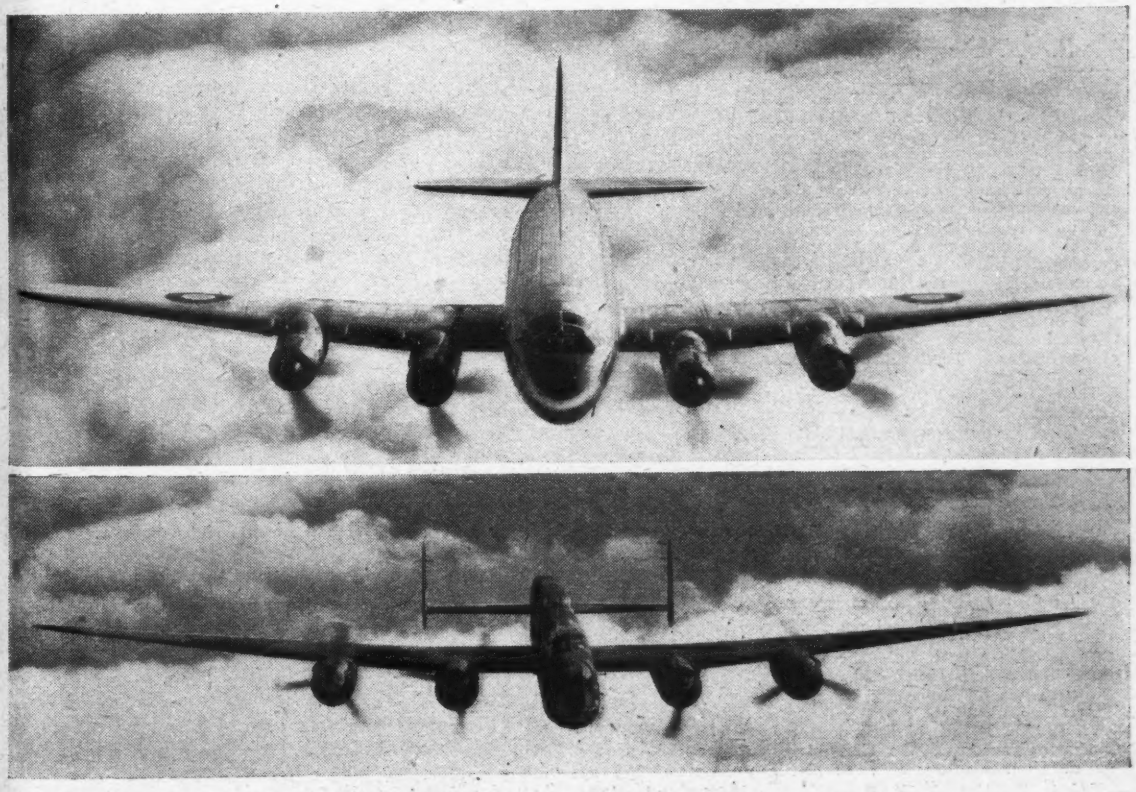
## Air Rank Officers—Form of Address

IN keeping with the practice of the Royal Navy and the Army in addressing officers of flag and general rank, the term "air marshal" is to be used in the R.A.F., except on strictly formal occasions, when addressing or referring to officers of the ranks of Air Vice-Marshal to Air Chief Marshal.

## A Fury Trainer

THE latest fighter to be developed as a two-seat trainer is the Hawker Fury. As announced elsewhere, an order for single- and two-seater Furies has been signed by the Iraqi Government and Hawker Aircraft, Ltd.

Designed to provide an aircraft suitable for advanced dual instruction and conversion to the most modern fighter types the Fury Trainer has both cockpits enclosed and an excellent view is



**A QUESTION OF CONCENTRATION:** Bulky freight loads necessitated the relatively large-diameter fuselage of the Handley Page Hastings (top). This will confer an exceptional measure of passenger comfort in the civil Hermes. The concentrated bomb load of the Avro Lincoln (below) is amenable to a much slimmer fuselage. Wing spans respectively are 113ft and 120ft.

## SERVICE AVIATION

claimed for the instructor. Essential controls are duplicated and an oxygen system and electrical intercomm. are installed. Provision is made for drop tanks and for deck-landing and accelerator gear for naval training.

Despite the addition of a second cockpit performance figures will be little affected and the excellent handling characteristics, for which the single-seater Fury is particularly noted, are expected to remain unaltered.

### *Marlborough College Scholarships*

ON May 17th entries will close for the next £50 per annum Hirst Scholarship to Marlborough College, open to sons of officers or ex-officers of the R.A.F. Application should be made to the School Secretary, Marlborough College, Wilts.

### *Reunions*

PAST and present members of 605 Squadron are invited to the first reunion dinner to be held at the Hungaria Restaurant, Lower Regent St., London, W.1, on February 8th. Tickets (21s), and details are obtainable from E. W. Battle, 229-231, High Holborn, London, W.C.1.

* * *

It is proposed to hold a reunion of No. 102 (Ceylon) Squadron, No. 4 Group. Ex-members wishing to attend should write to R. F. Gomm, 43, Valley Road, Loughton, Essex.

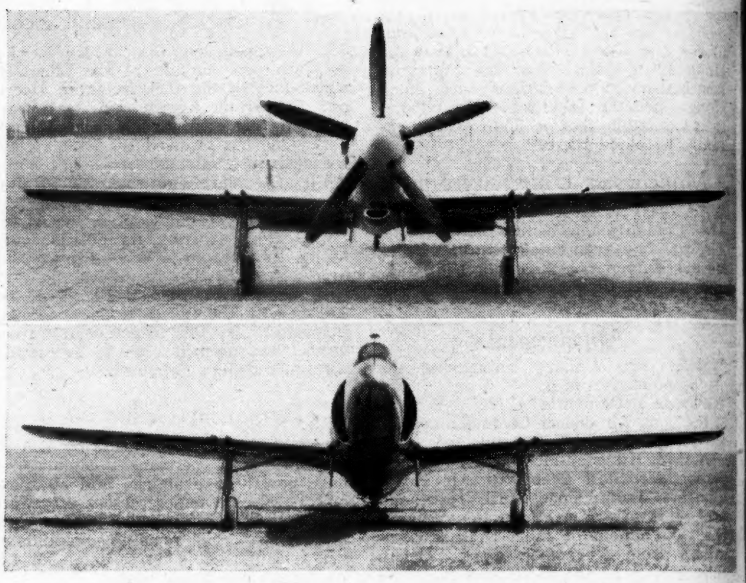
### *R.A.F. Escaping Society*

WITH Marshal of the Royal Air Force the Viscount Portal of Hungerford, K.G., G.C.B., O.M., D.S.O., M.C., as president, an R.A.F. Escaping Society has been formed to foster friendships between R.A.F., Dominion and Allied Air Forces personnel who escaped from enemy and enemy-occupied Europe and those who aided them. Through an organized interchange of visits there will be annual reunions and the helpers will be entertained privately in this country by the escapers. Travelling expenses will, in certain circumstances, be refunded by the Society and a proportion of the funds will be donated to Continental charities.

The Society is open to all members and ex-members of the R.A.F., Dominions and Allied Air Forces who, whilst serving within the framework of the R.A.F. on operational duties, were brought down in enemy and enemy-occupied territories and successfully escaped or evaded capture. All helpers will become honorary members and will not subscribe to the funds.

The inception of the Society—by Marshal of the Royal Air Force Lord Portal—dates back to the summer of 1945. At present other war theatres than Europe will not be included because of financial and staff limitations.

Chairman of the Committee is Air Vice-Marshal Sir Basil E. Embry, K.B.E., C.B., D.S.O., D.F.C., A.F.C., Director-General of Training at the Air Ministry, and the Hon. Treasurer is A. Cdre. E. S. Burns (Director of Personal Services). The members of the Committee are A. Cdre. Whitney Straight, C.B.E., M.C., D.F.C.; F/O. D. G. Southwell, W/O. G. McGregor and Sgt. F. W. Robertson, most of whom were "escapers" or "evaders" during the war. It will be recalled that 70,000 Reichmarks were offered for Sir Basil Embry's recapture. The secretary is F/L. E. Dales, whose office is at Adastral House, Kingsway, London, W.C.2.



**TWO YEARS' PROGRESS: The Supermarine Spiteful/Seafang of 1944, represented by the upper view, provided the wing and undercarriage for the E.10/44 jet fighter (below) first flown during 1946.**

### *"Mercury" Follows "Crusader"*

MENTION has already been made of the South African tour of the Central Bomber Establishment Lincoln *Crusader*. Now comes news that *Mercury*, the Halifax VI of the Empire Radio School, is heading for the same parts. She was due to leave yesterday (January 22nd). Her journey to the Union of South Africa will be made via the Middle East and on the way lectures will be given and new equipment explained to units of the R.A.F. and S.A.A.F.

*Mercury*, originally fitted out as a "flying classroom," is now equipped with the latest radio aids including H2S, IIIG., Gee II, Rebecca II and Loran, which will be demonstrated wherever possible. Further instruction will be given by means of some nineteen radio films which will be taken along together with a 16-mm projector.

In all, *Mercury* will travel more than 13,000 miles and lectures will be given at seven places on the way. The route flown will be Debden to Lyneham, Malta, Abu Sueir, Khartoum, Nairobi, Zwartkop, Langebaanwag, Brooklyn, and home by approximately the same route, to return to Debden on March 3rd.

The mission will be commanded by A. Cdre. T. T. P. F. Fagan, Commandant of the Empire Radio School, and W/C. D. H. S. Rusher, D.S.O., S/L. R. H. Fluke, F/L. C. A. Wood and F/O. J. W. C. Douglas will go as passengers to carry out instructional work. The crew will consist of F/L. R. E. Harrison, D.F.C. (Captain), F/L. J. L. Bowmer, D.F.C., D.F.M., F/O. R. Woonton, F/L. J. H. L. Wickson, Sgts. R. J. Poole and J. J. H. Scott, and W/O. W. H. Ward.

**Badge of No. 241 Squadron, R.A.F. "Find and Forewarn."**

**Badge of No. 178 Squadron, R.A.F. "Irae Emissarii" (Emissaries of Wrath).**

### *R.U.S.I. Lecture Session*

THE 1947 Lecture Session of the R.U.S.I., Whitehall, includes the following: January 29th, *The Organization of Industry in War*, by Sir Charles N. McLaren, K.C.B.; February 5th, *The Development of India as a Base for Military Operations*, by Lt. Gen. Sir Wilfrid Lindsell, G.B.E., K.C.B., D.S.O., M.C.; February 12th, *The Battle of the Atlantic*, by Captain G. H. Roberts, R.N.; February 19th, *Scientific Intelligence*, by Professor R. V. Jones, C.B., C.B.E.; February 26th, *The Work of Coastal Command in the Invasion of Europe*, by Marshal of the Royal Air Force Sir Sholto Douglas, G.C.B., M.C., D.F.C.; March 5th, *Manpower and the Services*, by Sir Godfrey Ince, K.C.B., K.B.E., B.Sc.; March 19th, *The Royal Navy in the Pacific*, by Captain E. M. Evans-Lombe, C.B., R.N.

At a date to be announced later, A. Cdre. C. B. R. Pelly, C.B.E., M.C., will lecture on *The Strategic Bombing of Germany*.